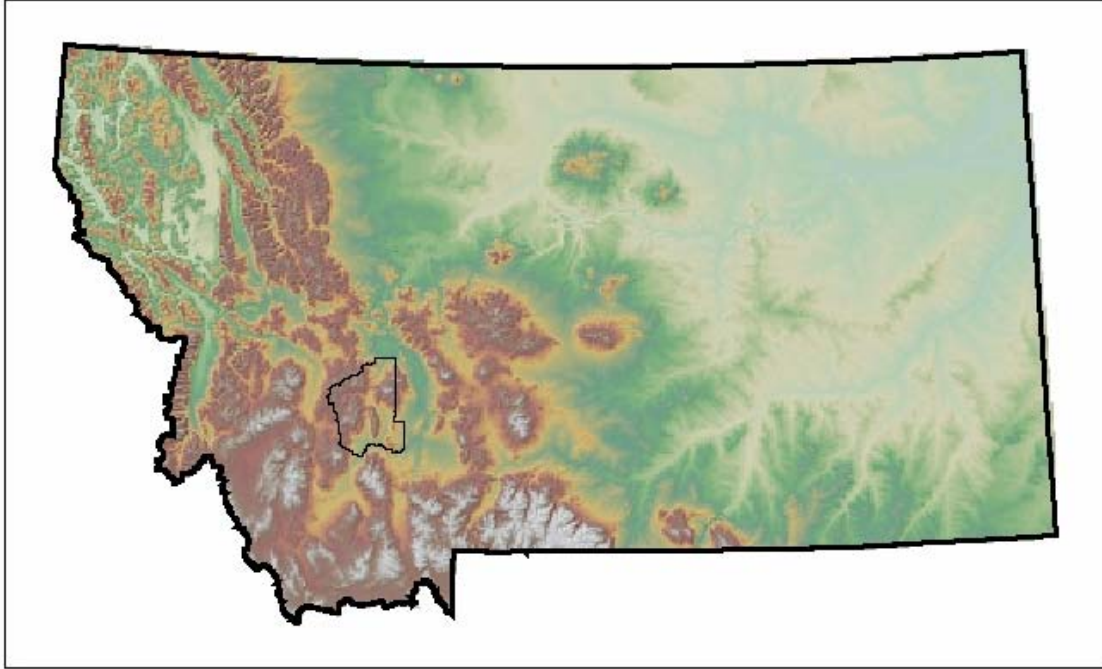


COMMUNITY WILDFIRE PROTECTION PLAN (CWPP)

Jefferson County, Montana



Prepared under contract to:

HEADWATERS RC&D AREA, INC.
Economic Development District
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Prepared for:

JEFFERSON COUNTY, MONTANA

In cooperation with:

CONCERNED JEFFERSON
COUNTY STAKEHOLDERS

SEPTEMBER 2005

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PLAN ACCEPTANCE

Local Government

Commissioner, Chuck Notbohm

Commissioner, Tom Lythgoe

Commissioner, Ken Weber

Local Fire Departments / Emergency Services

Basin Volunteer Fire Department
Chief, Jim Maher

Jefferson Valley/Whitehall (Town) Volunteer
Fire Department, Chief, Richard Strauss

Boulder (Town) Volunteer Fire Department
Chief, Larry Jones

Montana City Volunteer Fire Department
Rick Abraham, Chief

Bull Mountain Volunteer Fire Department
Chief, Buster Bullock

Willow Creek Volunteer Fire Department
Chief, George Reich

Clancy Volunteer Fire Department
Chief, Brent Farrell

County Fire Warden, Pat McKelvey

Elk Park Volunteer Fire Department
Chief, Mike Zemljak

Disaster and Emergency Services
County Coordinator, Sally Buckles

Jefferson City Volunteer Fire Department
Chief, Chris Bruski

State Forest Management

Montana Department of Natural Resources
District Fire Supervisor

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EXECUTIVE SUMMARY

The Community Wildfire Protection Plan (CWPP) for Jefferson County, Montana has been developed through a contract between the Headwaters Resource Conservation & Development Area, Inc. (HRCDA) and the Bureau of Land Management (BLM) with the cooperation and participation of Jefferson County. The HRCDA entered into a contract with Fox Logic, LLC (Fox Logic) of Florence, Montana to develop stakeholder collaboration, conduct stakeholder meetings, perform research, and carry out other activities necessary to produce a CWPP for Jefferson County.

Purpose Statement

The purpose of the CWPP is the generation of management recommendations that protect values at-risk from wildfire in the wildland-urban interface (WUI) including lives, homes, businesses, and essential infrastructure (e.g., escape routes, municipal water supply structures, and major power and communication lines), with appropriate consideration for other community values.

To avoid confusion, the terms “goal” and “objective” are not used to describe the intent of the CWPP. Rather, a “purpose statement” is used to stimulate discussion for CWPP development.

Overview

Development at the edge of forest or grassland areas is conducted in what is referred to as the WUI. This unique zone where structures meet or intermingle with undeveloped wildland or vegetative fuels is an area with potential to be at an increased risk to wildfire. Characteristics that make the WUI an attractive area to live in also make fire fighting and emergency response dangerous, difficult, and very expensive. To make matters worse, a buildup of vegetation, resulting from decades of fire suppression, and recent drought have increased the risk and probability of catastrophic wildfire in many areas of the WUI. Through the development of a CWPP, Jefferson County aims to reduce the risk of catastrophic wildfire and its potential consequences in the WUI.

The CWPP is a tool designed by and for at-risk WUI communities to pre-plan and improve their capability to negate and/or survive wildfire. The United States Healthy Forests Restoration Act of 2003 (HFRA) encourages the development of CWPPs. Section 101(3) describes a CWPP as a plan that:

1. Is developed in the context of the collaborative agreements and guidance established by the Wildland Fire Leadership Council and agreed to by the local government, local fire department, and state agency responsible for forest management, in consultation with interested parties and the federal land management agencies that manage land in the vicinity of an at-risk community;
2. Identifies and sets priorities for areas needing hazardous fuel reduction treatments and recommends the types and methods of treatment on federal and non-federal lands that will protect one or more at-risk communities and their essential infrastructure; and
3. Recommends measures to reduce the chance that a fire will ignite structures throughout an at-risk community.

Stakeholders and Plan Development

The development of the CWPP required active collaboration of interested Jefferson County stakeholders. Principal CWPP stakeholders included the local government, the local fire departments, and the Montana Department of Resources and Conservation (MT DNRC), with technical support and resource management input also received from the United States Department of Agriculture: Forest Service (USFS) and BLM.

Fox Logic invoked discussions with and received feedback from the public, private organizations, and federal, state, and local agencies to identify wildfire risks, priority areas, priority projects, and mitigation activities. Planning was based on verbal input from stakeholder meetings held during the spring of 2005 and written responses submitted to Fox Logic by interested entities. Input from public stakeholder groups was additionally encouraged through solicitation letters sent directly to potential stakeholder groups and public notices published in local newspapers (Appendix A and Appendix B).

To further maximize stakeholder outreach, a draft of the Jefferson County CWPP was mailed on CD ROM to participating stakeholders on August 10, 2005. After a two-week review period stakeholder comments were incorporated, and on September 2, 2005 the Final Draft, was posted via the Internet on the Fox Logic website for another two-week review period. Notification of the Internet posting was issued through email/traditional mail to all previously identified stakeholders. Finally, copies of the completed Plan were sent to the HRC&D and the County Disaster and Emergency Services (DES) office in Boulder on September 19, 2005.

Healthy Forests Restoration Act (2003)

The purpose of the HFRA is to support projects that carry out fuel treatments in and around at-risk communities under the National Fire Plan and the Western Governor's Association, 2001, *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy*.

The HFRA provides monetary aid for at-risk communities that complete CWPPs and expedites National Environmental Protection Act (NEPA) procedures for authorized fuel reduction projects on federal lands in the WUI.

The USFS and BLM are directed in accordance with *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan* (May 2002) to:

- “Develop an annual program of work for Federal land” in Jefferson County “that gives priority to authorized hazardous fuel reduction projects that provide for protecting at-risk communities or watersheds or that implement CWPPs” (HFRA Section 103(a)).
- Consider recommendations made in the Jefferson County CWPP in the generation of annual work plans for federal land (HFRA Section 103(b)(1)).
- Provide that financial assistance for authorized hazardous fuel reduction projects on non-federal land in Jefferson County will be allocated by federal agencies based on CWPP recommendations (HFRA Section 103(d)(2)).

The Wildland-Urban Interface

Section 101(16)(B)(ii) of the HFRA offers a definition of Wildland-Urban Interface (WUI) but communities are also encouraged to use the CWPP process to derive their own definition of WUI within their county. Jefferson County has defined its own WUI. The Jefferson County WUI definition includes:

- A WUI protection area including and extending four miles from the HFRA-defined WUI
- An area extending one mile on each side of a primary egress/ingress route
- An area extending one mile on each side of a major power line

Protection Priorities

The Jefferson County WUI was broken into four 1-mile-wide zones of diminishing protection priority extending concentrically away from the center of the WUI defined by the HFRA. Each protection zone is incrementally ranked with reduced protection priority as distance from the center of the WUI increases. Protection ranking is one of four factors used in determining mitigation priorities for the Jefferson County CWPP.

Risk Assessment

To illustrate the level of wildfire risk and facilitate planning for Jefferson County, the four WUI priority protection zones were used in conjunction with three other factors to delineate the WUI into high-, medium-, and low-risk land areas. Wildfire risk factors is determined by three factors:

- Potential Fire Behavior
- Ignition Probability
- Fire Regime Condition Class

The best available information, science, and technology were used in the prediction of Jefferson County fire conditions. Three geographic information system (GIS) model/mapping projects provided information critical to the scientific evaluation of the County land area. In addition, local fire authorities were asked to evaluate their emergency response capabilities within their respective fire protection districts and throughout the County.

Implementation, Monitoring, and Review

County stakeholders generated a short list of wildfire mitigation strategies that may be used to reduce WUI risk conditions. Further higher detail planning will need to be completed before mitigation activity can occur. Higher detail plans will incorporate one or many of the following strategies ranked by order of decreasing level of consideration:

- Fuels Management
- Education/Prevention
- Planning
- Development
- Training

- Inter-Agency Cooperation

Building on the mitigation strategies outlined above, the CWPP also contains information on reducing risks to structures. Recommended measures specifically address issues immediately around and in the individual structures at-risk within the WUI. Concepts introduced are primarily borrowed from the Firewise™ program.

Possible fire mitigation action will be implemented according to a diminishing level of risk and is referred to in the Plan as a fire mitigation priority rating (FMPR). A 5-year schedule beginning in 2005 and ending in 2010 addresses very-high-risk and high-risk areas first, medium-risk areas second, and all remaining areas and previously treated areas last. It is anticipated that 5 and 2.5 percent of the first and second priority implementation acreages respectively can be treated by 2010. It is not expected that a significant area of third priority, low-risk areas and maintenance of previously treated areas will occur during the first 5-year CWPP implementation period.

To ensure appropriate implementation of the Plan, the formation of a Monitoring Committee is recommended. This committee formed under the auspices of the County Fire Council, should conduct a minor review every year and a major review of the Plan in year 4 of implementation. Major review can also be initiated at any time during the life of the CWPP as determined by the Monitoring Committee.

BACKGROUND

General Information

Located in central Montana, Jefferson County sits within a triangle formed between the cities of Helena, Butte, and Bozeman (Figure 1). The County encompasses 1,656.7 square miles and contains low- to mid-elevation mountain ranges with the west county line defined by the Continental Divide.

Mining activities throughout the County have been and continue to be an important source of local employment and income.

Habitats ranging from dry grassland to ponderosa pine steppes and snowy alpine areas can be found throughout the county. No large lakes are present in Jefferson County, but water in the form of smaller lakes, streams, and rivers does account for 2.2 square miles of the County surface area. The largest flowing body of water, the Jefferson River, bisects the south portion of the County flowing east to west southeast of Whitehall. A second river, the Boulder, flows from the Elkhorn Mountain Range to Boulder then south to confluence with the Jefferson River. Water flow in the northern portion of the County is collected by Prickly Pear Creek which flows northward to Helena Valley.

Climate

The National Weather Service station at the Boulder Weather Station has maintained records since 1948. Record review indicates that the area is subject to a continental weather regime experiencing a maximum annual average daily temperature of 56.7 degrees Fahrenheit and minimum of 27.9 degrees Fahrenheit (WRCC 2004). The warmest month of the year is July with an average maximum temperature of 82.4 degrees Fahrenheit and the coldest month is January with an average low of 9.1 degrees Fahrenheit. Average annual precipitation in Boulder is 10.99 inches. June is the wettest month with 2.04 inches and February is the driest with 0.33 inches.

Local small-scale variability in temperature and moisture occur throughout the County because of natural terrain variation. Generally, moisture levels tend to be highest at middle elevations, on north-facing slopes, and in sheltered valleys (Barnes et al. 1998). Relatively dry sites can be found on low south-facing sites and high-elevation windy ridges. Temperature is also affected by terrain. High-elevation terrain and shaded, north-facing slopes at lower elevations exhibit colder temperatures. Low-elevation sites and south-facing slopes tend to be warmer.

POPULATION AND DEVELOPMENT

Total County-wide population in 2000 was estimated by the U.S. Census Bureau at approximately 10,049 people, a 26.5% increase over the 1990 census (U.S. Census 2000). At the same time, the northern portion of the County along the Interstate 15 corridor has experienced significant rural population influx with development of large residential lots into the interface of undeveloped wildland area. Montana City, located within this high growth zone, is the largest population center in the County, with a population of 2,094 people. The city of Boulder is centrally located in the County and acts as the County seat (Figure 1). In the southern end of the County, located along I-90, is the city of Whitehall the second largest city.

The population influx into the unincorporated northern part of the County is the result of people working in and commuting to Helena. Historically the majority of the County's population lived in or near Boulder and Whitehall but now with greater than half of the population living near Helena but within Jefferson County, development presents new planning challenges.

Wildland-Urban Interface

Developed land at the wildland interface is referred to as the wildland-urban interface (WUI). More specifically, the WUI is defined as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels,” as stated in the Glossary of Wildland Fire Terminology (NWCG 1996). The tremendous risk to life, property, and infrastructure in WUI communities and the dangerous and complicated situations firefighters face in these areas have helped drive community wildfire protection planning efforts.

Jefferson County has many areas where structures and undeveloped wildland commingle with approximately 900 houses outside the major urban clusters in the County (Census 2000). WUI issues are not just a local problem; an estimated 42 million homes or 37 percent of the nation's total homes lie within the WUI. These lands constitute 273,000 square miles or nine percent of the lower 48 states (Stewart et. 2003). Specific WUI issues and statistics including exact size, extent, and changes within have not been well-identified.

LAND AND FIRE

A large percentage of terrain in Jefferson County consists of rolling hills or rugged mountains separated by areas of broad open valley. Sagebrush-juniper habitat, coniferous forest, and in many places, coniferous forest with a deciduous quaking aspen or mountain alder component, occur throughout the upland area of the County (Figure 2). Tree species found in the County include Douglas-fir, black cottonwood, juniper, lodgepole pine, quaking aspen, ponderosa pine, sub-alpine fir, and whitebark pine. Wildland structure and composition are highly variable and change naturally with elevation, aspect, geology, and fire history.

A significant portion of land area is covered with a mosaic of forest and grassland that was historically important for logging and cattle ranching (Figure 3). Public land management agencies and private landowners once intensively managed large portions of the County for natural resource extraction. Recently much of the large-scale forest resource industry has ceased to exist, though mining continues to play a significant economic role in Jefferson County. Agriculture also continues to play an important economic role in Jefferson County with much of the valley bottomland and inter-mountain prairie, located primarily in a north-south strip through the center of the County, remaining in livestock and crop production. Most of these agricultural lands are by and large privately owned.

Land Ownership/Administration

Land in Jefferson County is owned/managed by five primary entities: private non-industrial landowners, USFS (Helena National Forest and Beaverhead-Deerlodge National Forest), BLM, Montana State Department of Natural Resources and Conservation (MT DNRC), and Fish, Wildlife and Parks (FWP) (Table 1) (Figure 3). Four Natural Research Areas administrated by the federal land management agencies (2,275 Acres) exist across the western edge of the County.

Administrator/Owner	Acres	% of Total
Private	464,048	43.80
U.S. Forest Service	460,925	43.50
Bureau of Land Management	96,708	9.10
State Trust Land	31,742	3.00
Other State Land	4,670	0.40
Fish and Wildlife Service	1,603	0.20
TOTAL	1,060,622	

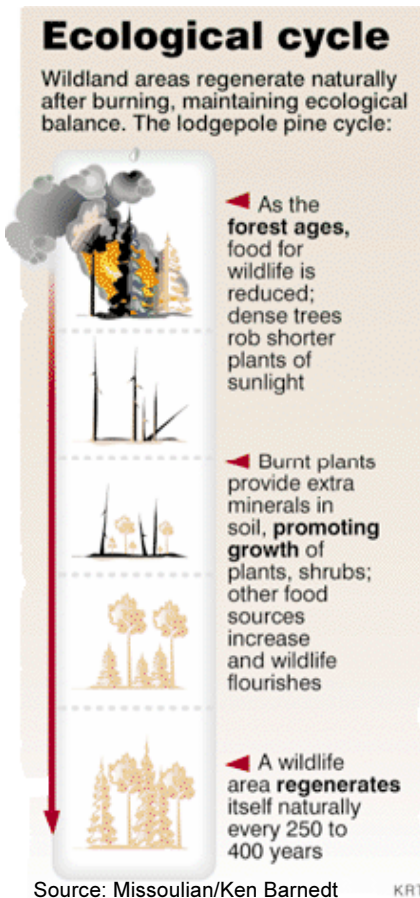
Source - MT NRIS 2004

Table 1 – County Land Ownership/Management

Historic Fire Occurrence

In Jefferson County and throughout the inter-mountain west, the majority of wildfires occur in July, August, and September. During these months high temperatures, dryness, and an increased incidence of lightning strikes create conditions conducive to the ignition and rapid spread of wildfire.

Before European settlement during the 1800s, numerous large and small fires occurred periodically throughout the region. Area forests have been historically subject to a specific natural fire regime. USFS researchers, Agee 1993 and Brown 1995, describe the role of naturally occurring fire in the absence of modern mechanical intervention. These natural fire regimes fall into one of five accepted historic fire regimes further developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001): (1) frequent, low-severity; (2) frequent, high-severity; (3) moderate-frequency, mixed-severity; (4) moderate, high-severity; and (5) infrequent, high-severity fires. An illustration of the ecological cycle and the natural role of fire in an infrequent, high-severity fire regime lodgepole pine forest is depicted below.



During the 20th century, fire policies dictated that public land management agencies and private landowners suppress wildfires throughout the west, including Jefferson County. These policies were likely the result of a desire by the public to protect the aesthetic beauty of the forest as well as the notion that fire destroyed monetary returns from forest products. Fires have been construed, by many, as a destructive force, one that needed to be eliminated as soon as possible.

Policies and attitudes have changed, and fire within the Jefferson County landscape is now considered by many to be natural and necessary for the general health of the greater regional ecology. Widespread fire suppression has denied the natural role of a major ecological force in forests and has generally resulted in negative impacts to forest health within the inter-mountain west. The negative impact of fire suppression can be observed in the forested areas of the County, of which many are over-stocked, insect- and disease-infested, and fire-prone. Devastating insect outbreaks alone in western Montana's forested areas affected nearly 200,000 acres in 2004 (Meyer 2004). Deteriorating forest health and vigor, resulting largely from fire exclusion, sustained drought, and increased development in remote areas has resulted in a potentially high- risk WUI fire situation.

Many area forests ecologically adapted to burning as frequent, low-severity; moderate-frequency, mixed-severity; or infrequent, mixed-severity fire regimes now, once ignited, burn as an infrequent, high-severity fire that threatens human life, structures, and the environment.

Changing the natural fire regime

Suppression of natural wildfire has resulted in ecologically negative and visually dramatic changes to wildland areas. The USFS photo progression from the Lick Creek study area on the Bitterroot National Forest visually represents the deviation in natural fire regime from a FRCC1 to an FRCC3. The Lick Creek photo series is a Fire Behavior Fuel Model 2.

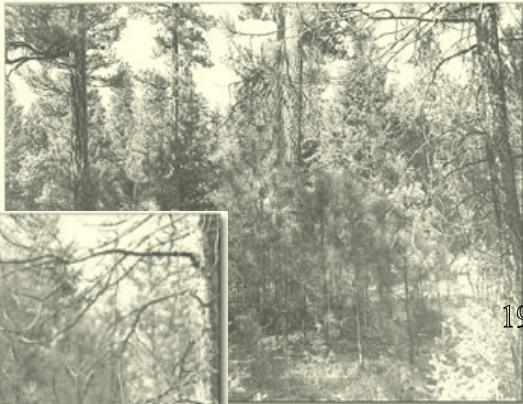
FRCC1

1909



1948

1958



1979

Photo Source: USFS

1989



FRCC3



Forests exhibiting a change of fire regime are classified by departure from the natural fire regime by fire regime condition class (FRCC) (Hann and Bunnell 2001).

It has been suggested by Dr. Stephen Arno, a leading fire ecologist recently retired from the USFS, that “(h)igh fuel loadings,” caused by fire exclusion, “eventually will be reduced by decay, fire (wildfire or prescribed fire), or removal” (Arno 1976). Forest fuel decay is too slow due to the cool, dry nature of the region’s forests in Arno’s opinion, so where fuel reduction programs are not established, nature may reduce fuel loads through large, uncontrolled wildfire (Arno 1976). Recent major fire years may provide support for this hypothesis.

Though fire suppression continues to be very good, with the majority of fires being extinguished while small, an increase in the average size of fires that cannot be suppressed, and the frequency with which those fires threaten the WUI is on the rise. It is these wildfires, and the potential for local catastrophic wildfire, which alarms fire managers and most citizens. Luckily, recent large damaging fires have not had high environmental, social, and economic impact on Jefferson County, but increasing statistical probability of more damaging wildfire(s) in the County’s WUI continues to rise as wildland conditions deteriorate and interface development continues to rise.

Local Fire Statistics

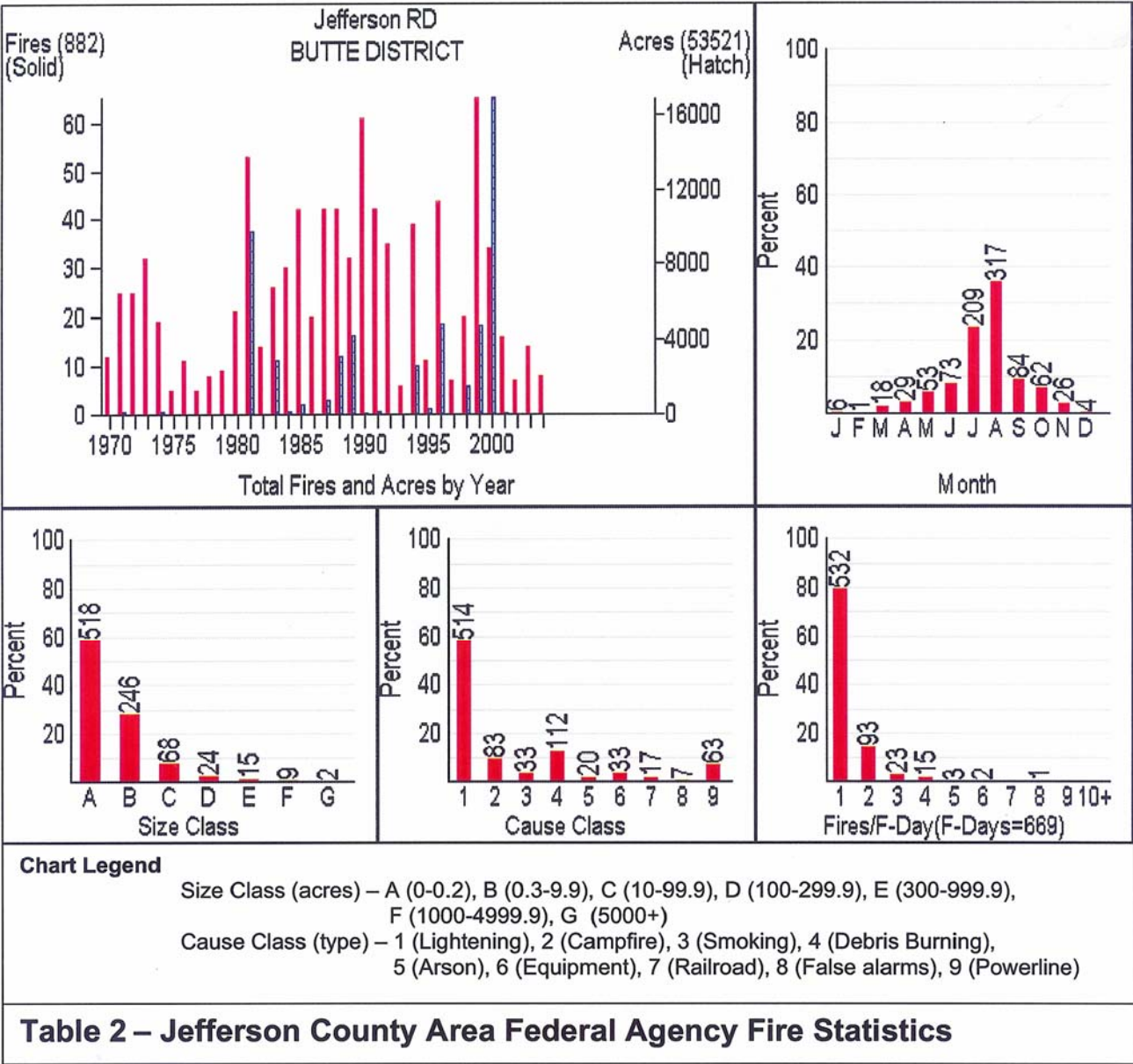
Fires that occur in Jefferson County are recorded in a database managed by the commanding fire agency. Because each fire respondent maintains their own record of a fire there are two primary databases for which fire information has been compiled for Jefferson County. These two fire databases, one for federal agencies and one for the MT MT DNRC information, were consulted to provide historic information on wildfire within Jefferson County.

The USFS and BLM fire records were compiled using the FireFamily Plus software package in which fires have been recorded since 1968. The software allows the user to assess and report many fire factors including fire year, size, and cause. Data queries for Jefferson County proper were not possible due to fire statistics being broken out by agency management areas, which do not correspond to County boundaries.

Table 2 on the next page was generated from user specified variables, input into FamilyFire Plus, to query federal agency fires on the USFS Helena National Forest, Jefferson Resource District and BLM Butte District. Though the agency management areas queried cover an area greater than Jefferson County, the fires reported are representative and do include fires in Jefferson County proper. Table 2 provides a concise summary of historic wildfires that have occurred in and around the County that were responded by federal agencies.

According to the output generated by FamilyFire Plus software and the MT MT DNRC database (records compiled since 1981), a total of 1,067 fires have burned 119,230 acres. The majority of fires occurred in the month of August, were most often caused by lightning, were most often less than one acre in size, and generally lasted less than one day before being extinguished.

A combined analysis of federal agency and the MT MT DNRC data indicates 58% of fires were caused by lightening and remaining 42% were human caused. Of the total human-caused fires, an alarming 44% were caused by mechanical equipment such as automobiles or forest equipment.



VALUES AT-RISK

Jefferson County stakeholders have identified values at-risk to loss during catastrophic wildfire. As set forth in the Montana Code Annotated (7-33-2202), Jefferson County is responsible for the protection of the County's range, farm, and forestlands from fire. This statute aims to protect areas with manmade and natural values at-risk from wildfire. Specific values at-risk within the WUI include lives, homes, businesses, historic structures/districts, and essential infrastructure (e.g., escape routes, municipal water supply structures, and major power and communication lines). Natural values at-risk include surface water quality, ecological stability, and forest resource health.

Though all values at risk, described below, are considered very important and deserve protection from the impact of wildfire, the protection of human life is of paramount importance, then the protection of critical infrastructure, structures and improvements, followed by protection of forest resource values.

Human Life

Loss of non-firefighter life due to wildfire is not statistically high but is of paramount importance to prevent. It is estimated that as many as 2,070 residents live in the Jefferson County WUI. These individuals are not likely to stay in harms way during a wildfire they may be inadvertently at risk of being trapped and killed during a catastrophic fire. A County wide Emergency Operations Plan (EOP) is in place for Jefferson County. An emergency evacuation plan is currently being developed for inclusion in the County EOP. This evacuation plan will likely will likely contain steps for reaction to wildfire threat including issuing an evacuation alert, an evacuation order, and an all clear after a wildfire threat has passed. Trained professional personal will evaluate the environmental conditions during a wildfire event and work with local law enforcement authorities to execute the evacuation steps.

Where civilians may not likely to be present during a wildfire event, firefighters will likely be in the area. Firefighters are faced with trying to protect natural and manmade values and human-life from wildfire while not placing themselves in peril. Though very well-qualified and trained to do their job the dangerous conditions they encounter are continually changing and pose a constant threat to life. No record of fire-cause fatalities could be found for Jefferson County.

The National Wildfire Coordinating Group (NWCG) has developed a system, the fire danger pocket card, to better inform firefighters of the local-current fire danger. Factors that increase firefighter danger vary with geographic region, local weather, vegetation type, slope, time of year, and time of day. The pocket card is developed using historic local weather conditions and a fuels model representative of a wildland area currently burning. The card also presents condition data that has lead to previous major wildfires in the area.

Risk Defined...

Function: noun

Etymology: French *risque*, from Italian *risco*

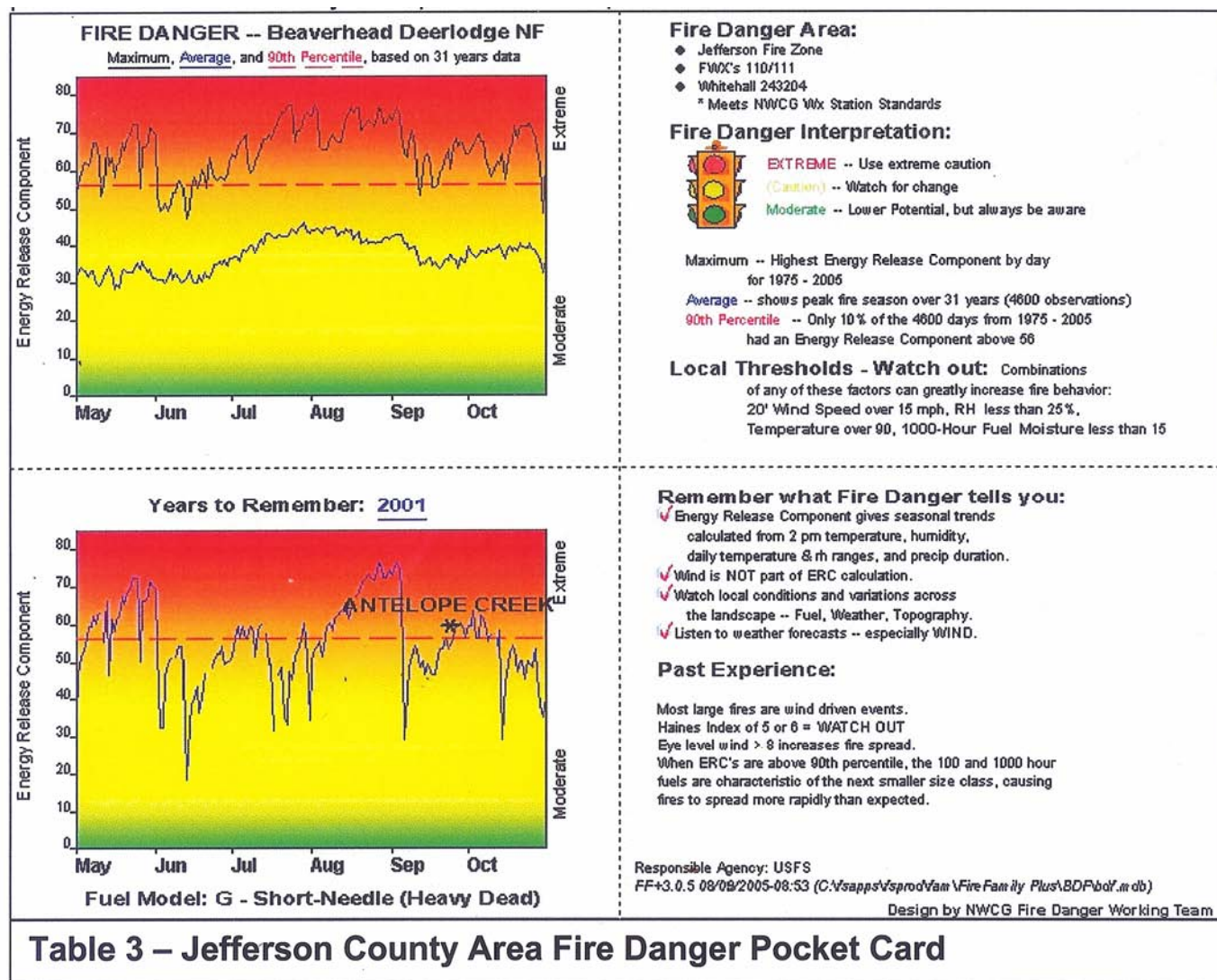
1 : possibility of loss or injury : PERIL

2 : someone or something that creates or suggests a hazard

3 a : the chance of loss or the perils to the subject matter of an insurance contract; also : the degree of probability of such loss b : a person or thing that is a specified hazard to an insurer <a poor risk for insurance> c : an insurance hazard from a specified cause or source <war risk>

Source: Merriam-Webster Dictionary

An index such as the Energy release coefficient (ERC), derived on a day-to-day basis by fire behavior specialists, is given to firefighters at the daily fire event briefing. An interpretation of fire danger can be made from that day's index using the pocket card. An example of one possible Jefferson County area pocket card is presented in Table 3.



WUI Structures

The monetary value of WUI homes is estimated using 2000 US Census data of the total 4,199 houses present in the entire County 1,418 are listed as being within the two census urban clusters not considered WUI: Boulder and Whitehall. The remaining houses total 900. As these housing units are outside the urban unit boundary designated by US Census they are regarded as WUI structures. Multiplying the 2000 US Census average house value for Jefferson County, \$128,700, by the number of estimated WUI houses results in a cumulative WUI housing value of \$115,830,000. This value reflects only the monetary WUI house value and does not account for the monetary value of other improvements or personal effects that may be at risk to wildfire.

Significant Sites

The *National Register of Historic Places* contains six listed sites in the County, three of which are structures located within the city of Boulder proper: the Boulder Hot Springs Hotel, the Jefferson County Courthouse, and the Montana Deaf and Dumb Asylum. Other sites include the W.C. Child Ranch located south of East Helena on SR 518; the Fraternity Hall in the ghost town of Elkhorn, and an area of prehistoric significance dubbed the "MacHaffie Site" near Montana City.

A number of Montana State sites are also considered significant within the County. Two of these sites, found in the southernmost portion of the County near Three Forks, are Lewis and Clark Caverns State Park, and the Parker homestead. Many other mining sites throughout the County are not listed in the Historic Register but are of historical significance to the community and may warrant safeguarding.

Suggesting a monetary value for historic sites in general seems trivial, as their benefits to society are invaluable.

Forest Resources

The monetary value of the forest in Jefferson County is difficult to assess as its values for recreation, aesthetics, carbon sequestration, clean water, etc. are difficult to quantify and may be considered by some to be invaluable.

Assigning a monetary value for standing timber, as a potential commercial resource is easier to calculate. Currently there are approximately 135,835 acres of commercial timber in Jefferson County (HRC&D 2005). Using the taxable dollar value for fair value forestland of \$599.25/acre provided by the Montana Department of Revenue (MT DOR 2005), the total taxable value the County's forestland totals \$81,399,124.

FIRE PREPAREDNESS

A community's ability to fight wildland and/or structural fire once ignited is determined by its capacity to respond, confine, contain, and control a fire incident. Jefferson County has nine rural volunteer fire departments, with a total of 161 volunteers, charged with primary response to emergency wildfire incidents throughout the County. The volunteer fire department (VFD) crews also work with USFS, BLM, MT DNRC, and municipal fire departments to provide initial attack response and support for these fire incidents. Wildfire protection agreements are in place to provide mutual aid between all capable response departments and agencies for the County and adjacent counties. Fire suppression jurisdictions for each of the agencies or departments are depicted in Figure 4.

VFD personnel are skilled, trained, and equipped to respond to many WUI wildfire incidents. During bad wildfire years, VFD crews and equipment have been pushed to the limit of their response capabilities. Continued interface development, further forest condition deterioration, and sustained drought have the potential to place even greater demands on fire response crews, and equipment needs have surpassed availability at many departments in the County.

Jefferson County has recently completed a pre-disaster mitigation plan (PDM) with the aim to improve overall emergency preparedness for the County where necessary. The PDM recommendations and conclusions overlap the CWPP in the area of County fire defense and preparation.

Critical Facilities At Risk

Fire preparedness depends on resources being available for firefighting. Critical facilities in the WUI that are at risk to potential catastrophic wildfire include the Basin VFD Station. The Basin VFD Station is critical to fighting wildfires and loss of the structures as a result of fire would in turn leave inadequate firefighting resources within the County. The Basin VFD volunteers should continue fortification efforts to an area around the department structures that will guarantee defense from wildfire.

Please refer to the PDM for further information and discussion of critical- and non-critical facilities and vulnerable structures in the remainder of the County.

Evacuation Plan

County planning authorities are currently developing an emergency evacuation plan for annex into the EOP. Wildfire evacuation routes, marshalling points, and procedures need to be established in the evacuation plan. Principal evacuation routes as outlined in the Fire Smart manual (2003) should:

- "Lead away from an approaching wildfire to a safety zone" such as large irrigated agricultural areas.
- "Be designed with consideration of prevailing winds and avoid areas of dense forest fuels along the route.
- Be wide enough for two-way traffic (consider incoming fire emergency vehicles).

- Be well marked with standard signage. Road surface and grade should be suitable for two wheel-drive cars.”

WUI residents and homeowner associations should also be encouraged to preplan for evacuation scenarios and familiarize themselves with the evacuation plan and the EOP.

Critical Egress/Ingress Routes

Access to and from populated areas of the County is important for emergency response for firefighters and for residents during a catastrophic fire event. Firefighters need trouble-free access to and from subdivisions so that they may provide the most effective response for structure and life protection. Residents also need the opportunity to retreat from WUI areas in the face of wildfire.

Many populated areas throughout western Montana, including Jefferson County, have subdivisions with only one route of egress/ingress, roads of inadequate width, bridges of limited weight-bearing capacities, and high fire fuel loads within close proximity to the roadway. These are just some of the many situations that may compromise the protection and evacuation of WUI areas.

Nearly all of Jefferson County’s existing WUI subdivision access roads have at least one egress/ingress risk element listed above in need of improvement. Many have multiple problems. One such subdivision access road, drawn to attention, is the Basin Creek road north of Basin. This road was originally established for resource extraction purposes and now would greatly benefit from multiple egress/ingress risk mitigation improvements to allow safe access and escape for a growing number of residences in the drainage.

Though there are many roads in Jefferson County that may be compromised in the event of wildfire, one of significant importance, in an area of elevated risk is US Interstate 15 through the Basin area. This highway is of significant importance as is a primary access route through Jefferson County.

Fire Fighting Equipment

Fire departments in the County are equipped with numerous wildland firefighting tools and techniques. Information gathered from the fire chiefs through meetings and correspondence indicated that no major equipment shortages exist but did indicate that training and volunteer recruitment, as well as general equipment inventory can always be improved. It is recommended that excessively old engines/tenders in questionable condition or equipment with outdated or hard to find parts should be upgraded within the next five years. Table 4 lists the resources available in the County as provided by the DES coordinator.

Other equipment is available to County fire departments through equipment loan from the MT MT DNRC and through cooperative aid agreements such as the Jefferson County Annual Wildfire Operating Plan.

The Elk Park fire department appears to be marginally equipped to provide initial attack response to a wildfire event. The department depends largely on loan equipment from the State to provide adequate area protection.

Development Requirements

No required development regulations regarding wildfire protection are present in Jefferson County. The Jefferson County Growth Policy outlines policies for future development in the County. Though County regulation does not require fire planning in the WUI, the following excerpt from the Growth Policy demonstrates that County planners have been proactive regarding wildfire. The policy regarding wildfire and fire suppression reads:

“Goal: Minimize risk of fire by management and planning, and to permit the effective and efficient suppression of fires in order to protect persons, property and forested areas.”

“Objectives:

- A. Encourage fire protection measures throughout the county, giving special emphasis to the extreme fire hazards at the wildland/urban interface.
- B. Complete fire hazard mapping for Jefferson County.
- C. Encourage that all developments be within a fire protection district, or have a contract for service with a fire protection district.
- D. Subdivisions should be planned, designed, constructed and maintained so as to minimize the risk of fire. Developers should submit a defensible space plan for each subdivision to the appropriate fire district for its review.
- E. Encourage fire resistant construction.
- F. Promote cooperation with local fire districts and state and federal agencies to develop and provide a wildfire educational program.
- G. Promote fire services for all subdivisions.
- H. Promote adequate water supply systems.
- I. Support adequate ingresses and egresses in all subdivision planning.
- J. Promote vegetation policies that reduce fire hazards.”

Required adherence to these current wildfire Growth Policy recommendations needs to be contemplated by local government.

Units	Equipment	Units	Equipment
Basin Volunteer Fire Department		Jefferson City Volunteer Fire Department	
2	Type 6 Wildland Engines	1	Structure Truck 400 gal
1	Type 3 1000 gal pump/roll	1	Brush Truck 200 gal
1	Type 3 100 gal pump/roll 4x4	1	Brush Truck 250 gal
1	Type 1 Structure engine	1	Water Tenders 4000 gal
14	SCBA	1	Water Tender 1800 gal
40	Turnout Pants/Jackets	3	Fold-a-tanks 2500 gal
24	Structure Boots	1	Floating Pump
Cataract Private Fire Department		4	Bendex King hand held radios
2	Type 6 Wild Land Engines	5	SCBA sets (very old)
1	Type 4 1000 gal engine	3	spare tanks
1	Type 3 1000 gal engine	12	Hard Hats
20	wildland shirts/pants/shelters	12	Pulaskys
8	turnout coats/pants	12	Shovels
12	SCBA	12	Rakes
12	mobile radios	Jefferson Valley/Whitehall Fire Departments	
20	Pulaskis, shovels, etc	2	Type 1 structure trucks
6000'	hose	1	Type 3 quick attack truck
4	portable pumps	1	Type 6 DSL truck
220	assorted fittings	1	4000 gal tender with a pump and set of spray bars
Boulder Volunteer Fire Department		1	1500 gal port a tank
1	2000 Structure Engine	2	Floating pumps
1	1970 vintage Structure Engine	1	Electric generator
1	2000 Emergency Rescue Pickup 250 gal	2	Chain saws
Bull Mountain Volunteer Fire Department		1	Chop saw
2	Engines	1	Sawsall
3	tenders/tankers	1	Hydraulic jaws of life
2	Brush Trucks	Montana City Volunteer Fire Department	
Clancy Volunteer Fire Department		1	1996 Class A Pumper, 1250 GPM pump, 1000 gal
1	2000 Structure Truck 1250 gpm pump	1	1979 Class A pumper, 1500 GPM pump, 500 gal
1	1975 Structure Truck 1000 gpm pump	1	1996 Tender,
1	1975 tender 4000 gallon	1	1999 Tender, 1000 GPM pump, 3000 gal
1	Tender/wildland truck	1	1984 Mini pumper, 500 GPM pump, 250 gal
1	1992 Brush Truck	1	2000 Brush truck, 250 GPM pump, 250 gal
1	1994 Brush Truck	1	Floating pump 250 GPM
25	Pagers	2	Generators
	Portable Radios	1	Set extracation tools
	Misc tools and hoses	12	SCBA
	Compressor	15	Spare SCBA tanks
	Cascade system	2	Mobile radios
	Thermal Imager	12	Portable radios
	Structure Turn outs for all members	1	Rescue saw
	Wildland gear for all members	3	Chain saws
Elk Park Volunteer Fire Department		1	Trauma kit
1	DNRC Tender	Willow Creek Volunteer Fire Department	
5	Miscellaneous Emergency Trucks/Engines	1	1984 GMC 1 ton 4x4
1	Generator	1	1983 Intl Water Tender
1	Chain saw	1	1990 Chev 1 Ton 4x4
7	Helmets	1	1999 Chev 3/4T 4x4 ext cab
1	Pump	1	1970 Chev 4x2 brush truck
3	Radios	14	SCBA
		1	150gpm Porta-Pump/Pora-Tank

Table 4 – Fire Suppression Resources

FIRE AND WILDLAND-URBAN INTERFACE RISK

Jefferson County's risk from wildfire is largely determined by a combination of four factors: the area of the county that lies within a defined Wildland-Urban Interface; what values are at-risk to wildfire in the defined WUI; the susceptibility of those values to wildfire; and the ability of the community to protect those values.

Defining the Jefferson County Wildland-Urban Interface

It is the opinion of Fox Logic and the Jefferson County stakeholders that there is no single definition of WUI that will work in all areas at-risk to wildland fire across the nation. The Jefferson WUI definition builds upon the nationally recognized HFRA WUI definition.

At the stakeholder meetings and through electronic and traditional mail correspondence stakeholders were asked what they expected from the WUI definition and presented with examples of other existing definitions from the local and national level. The following WUI definition was developed based on stakeholder comment and reaction.

Healthy Forest Restoration Act Wildland-Urban Interface

National HFRA WUI mapping has been compiled in part with funding by the USFS North Central Research Station and completed by the Applied Population Laboratory (APL) at the University of Wisconsin and Spatial Analysis for Conservation and Stability (SILVIS) at the Department of Forest Ecology and Management, Madison, Wisconsin. The SILVIS project used the following definitions and data to complete the HFRA WUI identification and mapping (Stewart et al. 2003):

- **Housing Density**

"Housing density information was derived from U.S. Census data. Analysis was conducted at the finest demographic spatial scale possible, Census blocks, from the 2000 Census. All measures of housing density are reported as the number of housing units per square kilometer."

- **Landcover**

"We utilized the National Land Cover Dataset (NLCD), a satellite data classification produced by the USGS with 30m resolution based on 1992/93 imagery and available for the entire U.S. (Vogelmann et al. 2001) to identify 'wildlands.' Our definition of 'wildlands' encompasses a range of management intensities. NLCD classes that we included as 'wildlands' are forests (coniferous, deciduous and mixed), native grasslands, shrubs, wetlands, and transitional lands (mostly clear-cuts). We exclude orchards, arable lands (e.g., row crops) and pasture."

- **Wildland-Urban Interface (WUI)**

"WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres (16 ha). Intermix communities are places where housing and vegetation intermingle. In intermix, wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than 1 house per 16 ha. Interface communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house per 40 acres, have less than

50 percent vegetation, and are within 1.5 mile of an area (made up of one or more contiguous Census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.”

The SILVIS project identified a total of 3,204 WUI interface acres and 16,146 acres of WUI intermix, for a total of 19,350 acres of total WUI in Jefferson County (Stewart et al. 2003).

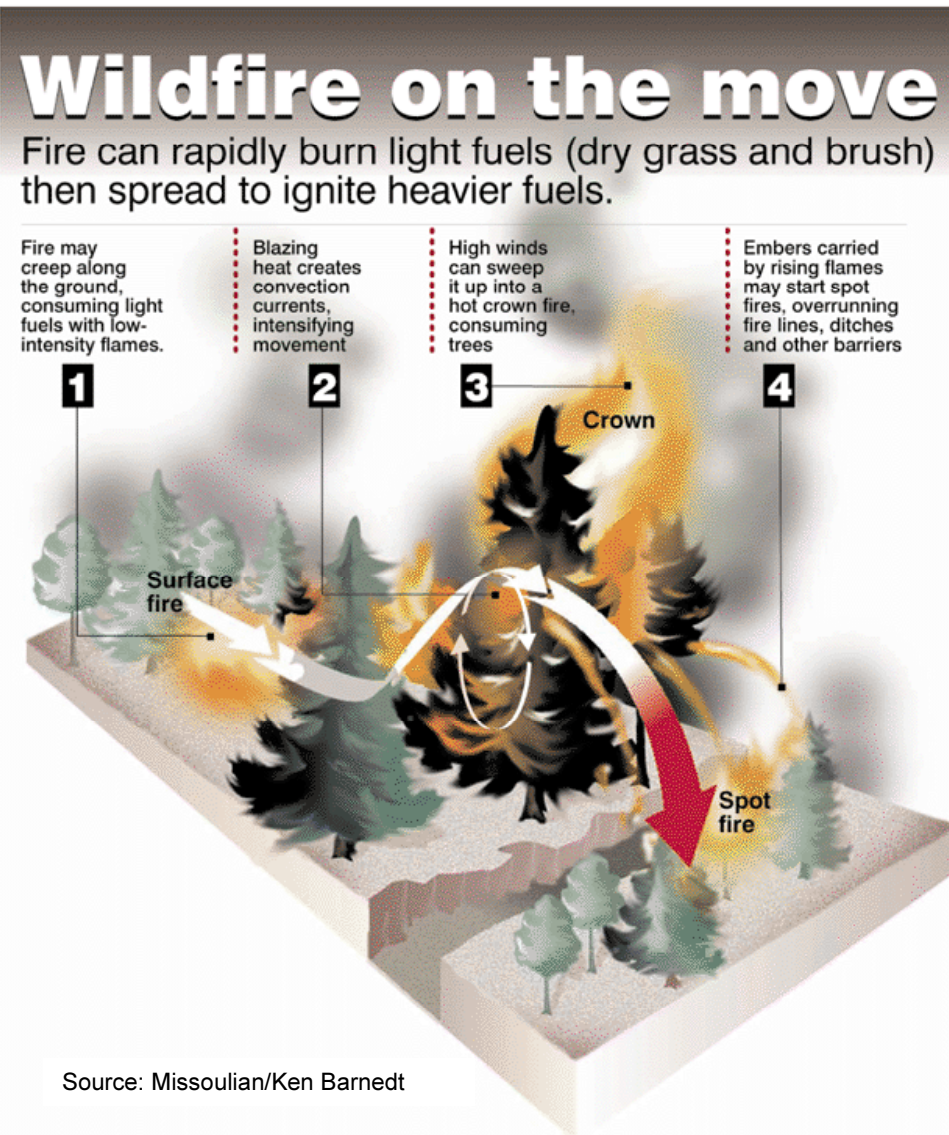
Jefferson County Wildland-Urban Interface

To ensure Jefferson County values are adequately protected during an extreme wildfire event it is necessary to expand upon the HFRA WUI defined by the SILVIS project. The following areas are included in the Jefferson County WUI definition:

- WUI Protection Buffer

A WUI protection area or buffer extending 4 miles out from the edge of the HFRA-defined WUI is included in the Jefferson County WUI. This protection area provides a distance away from

values at-risk within the WUI in the event of extreme wildfire behavior. The buffer is designed to better ensure adequate emergency protection in the event of a catastrophic crown fire.



Crown fires are supported mainly in foliage (fuels) of the upper tree canopies in densely forested areas. Crown fires may promote spot fire ignition caused by convection-carried firebrands ahead of the main fire front making a fire much more difficult to contain, confine, and control. Not all wildland fires “crown,” but when the condition occurs it is one of the fastest spreading and most intense types of fire, posing an especially high risk to human life

and County values in the WUI. Therefore, crown fire duration and rate of spread (ROS) were key factors used in the determination of a WUI crown fire buffer in the northern Rocky Mountains.

The 4-mile WUI definition adopted by Jefferson County is based on scientific modeling and research published in *Predicting Behavior and Size of Crown Fires in the Northern Rocky Mountains* (Rothermel 1991). Mr. Duane Harp, District Ranger, USFS, Helena National Forest completed interpretation and application of Rothermel's research.

Mr. Harp offered the two following methodologies and calculations, based on Rothermel's research, to derive an optimum WUI buffer distance that would minimize risk to community values during a crown fire and maximize emergency response opportunity. The calculations show how a fire may burn during a theoretical worst-case scenario crown fire.

WUI Buffer Calculation

Rothermel's research included the study of seven actual fires that produced crowning conditions. The fires occurred for a period of between two and five hours duration, with an average duration of 3.5 hours.

The average forward ROS of the seven crown fires was 1.4 miles per hour.

The average fire duration multiplied by the average ROS resulted in the determination of total distance the head, or front, of the fire spread during an average crown fire.

The average fire duration multiplied by the average ROS resulted in the determination of total distance the head of the fire spread during an average crown fire, 4.9 miles.

Alternatively, Rothermel's crown fire research data was used to calculate individual spread distances for each of the seven crown fires separately. Individual fire spread distances were summed and then divided by the total number of fires. The resultant number is equal to the average distance of fire spread, 3.7 miles.

Mr. Rothermel's research and Harp's calculations indicate that the 1.5-mile HFRA WUI area is not an adequate safety buffer during a worst-case crown fire scenario. Therefore, an expanded WUI protection area extending 4 miles outside the HFRA-defined 1.5-mile WUI will allow for better protection of values at risk from the forward progression of an encroaching fire where fire crowning conditions may exist. While the majority of wildfires are typically extinguished when small, the aforementioned methodology accounts for the minority of fires that cannot be caught and that become large running crown fires in heavy wildland fuels. The calculated 4-mile buffer should allow enough time (3.5 hours) for emergency crews to respond and complete evacuations during the worst-case fire.



Problem WUI Road
Photo Source: Russell Fox

- Road Buffer

Primary and secondary highways that provide egress/ingress for County residents and fire protection departments/agencies were assigned a 1-mile buffer. It is also suggested that subdivision roads required for egress/ingress but not covered by the two other WUI buffer areas be buffered to the maximum easement width. Road buffers will also serve as firebreaks for fire containment.

- High Voltage Power Line Buffer

High voltage power lines (>250 Mega Volt) were assigned a 1-mile buffer as a protective measure to ensure that the County power supply can be adequately protected during a wildfire event and to reduce the probability that a power line fire ignition will travel beyond the power line corridor. Power line buffers will also serve as firebreaks for fire containment.

Priority Protection Zones

To allow for systematic prioritization of the Jefferson County WUI for fire protection, it was necessary to delineate the 4-mile WUI buffer area, described in the previous section, into 1-mile increments of diminishing priority. It was assumed that a decrease in density of values at-risk as well as an increasing emergency incident response time would occur linearly with greater distance from the WUI centerline. Therefore, there is a decreased total incident protection need as there is decreased density of values. WUI priority protection zones were delineated in 1-mile increments as follows:

- Zone 1 – acreage including and extending 1 mile from the HFRA WUI interface/intermix.
- Zone 2 – acreage between 1 and 2 miles from the interface/intermix boundary.
- Zone 3 – acreage between 2 and 3 miles from the interface/intermix boundary.
- Zone 4 – acreage between 3 and 4 miles from the interface/intermix boundary. Zone 4 also includes buffer and power line buffer acreages.

The area within zone 1, assigned the highest WUI priority protection zone ranking, accounts for the highest density of values at-risk in the WUI and therefore receives the highest priority for protection; subsequently zones 2 through 4 were assigned a decreasing priority ranking (Figure 5). The WUI priority protection zone acreages by administration/ownership for Jefferson County are listed in Table 5.

Administrative Agency/ Owner	Priority Zone 1	Priority Zone 2	Priority Zone 3	Priority Zone 4	Total WUI Zone
Private	126,254.96	81,269.46	53,175.84	58,350.44	319,050.7
USFS	52,819.93	76,353.53	98,311.18	102,623.34	330,107.98
BLM	19,289.05	18,001.45	14,021.71	15,899.19	67,211.4
FWP	45.84	674.47	689.50	922.20	2332.01
State Trust Land	7,670.97	6,991.22	6,173.82	5,412.89	26,248.9
TOTAL	206,080.74	183,290.13	172,372.03	183,208.05	744,950.95

Table 5 – WUI Priority Protection Zone Area by Ownership

Risk Assessment

To assess the risk of wildfire exposure in the County's WUI it was necessary to first generate a model that assesses the present fire hazard and then correlate the exposure this hazard presents to the WUI. The defined Jefferson County WUI priority zones and three existing geographic information system (GIS) layers/data in addition to information provided by local stakeholders, universities, and federal and state land management agencies were used to complete the modeling process.

Fire Hazard

To estimate the risk to values within the Jefferson County WUI in the event of wildfire, an examination of fire hazard at a landscape level is necessary. In the absence of previous fire hazard study specific to Jefferson County, Fox Logic, with direction from the stakeholders, selected two previously completed modeling projects to build a model of fire hazard across the County. Input data and maps for the model came from the Ignition Probability Model, Fire Behavior Fuels Models, and FRCC model provided by the Wildlife Spatial Analysis Lab (WSAL) at the University of Montana.

- **Fire Behavior Fuels Modeling**

Three primary environmental factors influence fire behavior: fuel, weather, and topography. To best approximate these factors, fire behavior fuels models developed by Rothermel (1972) and Albini (1976), estimated and mapped by the FireRisk 2000 project at WSAL (2000) for the USFS (Figure 6), were incorporated into the fire risk/impact model. These fire behavior fuels models are intended to estimate total theoretical fuel load, fire rate of spread (ROS), and flame length present during a peak burning period of the fire season.

Hazard Defined...

Function: noun
 Etymology: Middle English, from Middle French *hasard*, from Arabic *az-zahr* the die
 1 : a game of chance like craps played with two dice
 2 : a source of danger
 3 a : CHANCE, RISK b : a chance event : ACCIDENT
 4 obsolete : STAKE 3a
 5 : a golf-course obstacle
 - at hazard : at stake

Source: Merriam-Webster Dictionary

Describing Fire and Fuels					
Fuel Model	Vegetation Types	Fire Behavior	Fuels	Rate of Spread (ft/hr)	Flame Length (ft)
1	Perennial grasslands, annual grasslands, savannahs, grass-tundra, grass-shrub with < 1/3 shrub or timber	Rapidly-moving	Cured fine, porous herbaceous: 0.5 - 0.9 tons surface fuel /acre; 0.5 - 2 ft depth	5,148	4
2	Shrub, pine with <2/3 shrub or timber cover	Moderate spread in herbaceous with added intensity from litter/wood and production of firebrands	Fine herbaceous surface cured or dead, litter, dead stem or limb wood; 1 - 4 tones/acre; 0.5 - 2 ft depth	2,310	6
5	Moist or cool shrub types (alder), forest shrub, regeneration shrub fields after fire or harvest	Slow-moving and low moderate intensity	Green foliage with w/o litter; 3 - 5 tons/acre; 1 - 3 ft depth	1,188	4
8	Closed-canopy short-needle conifer types, closed-canopy	Typically slow moving with low intensities; can move rapidly with high intensity with low fuel moistures and hot/dry/windy conditions	Usually low- to moderately-flammable foliage with litter or scattered vegetation understory; 4 - 6 tons/acre surface fuels; 0.1 - 0.5 foot depth	106	1
9	Long needle conifer types (ponderosa)	Fast-moving fires with moderate to high intensity depending on amount of surface fuel	Flammable foilage with needle litter and some dead, downed woody material; 3 - 4 tons/acre; 0.1 - 0.5 foot depth	495	2.6
10	Any forest type with >3" dead, downed woody fuels	High fire intensity with low fuel-moisture and fast moving with wind	Dead, downed > 3" woody fuels and litter; 10 to 14 tons/acre of total surface fuel < 3"; 0.5 - 2-foot depth; 10 to - 14 tons per acre total fuel load < 3"; 0.5 to 2-foot depth	521	4.8

Source: Anderson 1982

The fuels models (30m grid) are described by the most common fire-carrying fuel type (grass, brush, timber litter, or slash), loading and surface area-to-volume ratio by size class and component, fuelbed depth, and moisture of extinction. Each of the total 13 fuels models has a specific estimated total fuel load (< 3-inch dead and live, ton/acre), ROS, and characteristic flame length attributable to the conditions, including inferred weather and topography of an average site in the wildland. Numerically denoted from 1 to 13, fuels models are described by two distinct orientations with two fuel groups in each orientation: vertically, as in grasses and shrubs, and horizontally, as in timber, litter, and slash (Anderson 1982). Not every fuel model will be represented within a given area of the landscape.

Fire behavior fuels models in the FireRisk 2000 dataset were assigned on the basis of covertype, and/or potential vegetation type (PVT), and/or size class, and/or canopy by WSAL. Fire management personnel throughout the Northern Region helped develop the model assignment rules for the FireRisk 2000 fire behavior fuels models. A complete description of the fire behavior fuels models estimation and rule assignment can be found in the FireRisk 2000 readme.txt file that accompanies the data set (WSAL 2000).

The fuels models present in Jefferson County as illustrated in Figure 6 are 1, 2, 5, 8, 9 and 10. Each fuels model was ranked, for GIS analysis, based on a weighting value derived from the addition of estimated total fuel load, flame length and ROS provided in *Aids to Determining Fuels Models for Estimating Fire Behavior* (Anderson 1982). This simple fuels behavior model ranking method resulted in the following prioritization (from highest to lowest fire behavior fuels ranking): model 10, 2, 5, 9, 8, and 1.

- Ignition Probability Modeling

A fire ignition probability model GIS layer also developed by the WSAL team for the USFS Region One Cohesive Strategy Team, using USFS fire ignition data, the same data set used in the Fire Statistics section of the CWPP, was selected to portray countywide fire ignition probability based on the predicted incidence (i.e. # fires/1,000 acres /10 years) (Figure 7).

This "...layer is based on an analysis of natural and human caused fire starts from 1981 through 2000. Fire start densities per 1 km cell were calculated using a point interpolate function based on the fire start data. A fire ignition probability layer was then created based on a natural break(s) analysis of the fire start densities. Four fire ignition probability classes were mapped: 1 (low), 2 (mod), 3 (high), and 4 (very high). This layer was based on a fire start point coverage assembled from multiple sources but some data gaps are possible during the 20-year period covered. Each 1 km cell has been assigned relative weighting of probable fire ignition: 1 (low), 2 (mod), 3 (high), and 4 (very high)" (CST 2002).

- Fire Regime Condition Class Modeling

Wildfire in Jefferson County may also have acute negative impact on the natural wildland ecosystem. In an effort to account for this impact, a FRCC model has been included as part of this risk assessment. The WSAL FireRisk 2000 data set includes a FRCC model that estimates the deviation of wildland from its natural fire regime (Figure 8).

Fire Condition Class is based on degree of departure between predicted current and historical fire regimes developed by Mr. Colin Hardy and Mr. Steve Barrett respectively. Mr. Jeff Jones and Doug Berglund of the USFS assigned rules for determining degree of current departure from natural fire regime. It is important to note that the ruleset has not been peer-reviewed and is considered a draft model. Please see the complete description of the FRCC estimations and rule assignment can be found in the FireRisk 2000 readme.txt file that accompanies the data set (WSAL 2000).

The areas estimated as FRCC 3 are of particular concern and have been theoretically fire-deprived for three or more fire cycles from their natural fire return interval. The risk of extensive ecological damage to key ecosystem components during a natural fire event in these areas

Consequences of a Changed Fire Regime

Fire Regime Condition Class	Description	Species Composition and Structure	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Species composition and structure are functioning within their natural (historical) range at both patch and landscape scales.	<p>Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics.</p> <p>Composition and structure of vegetation and fuels are similar to the natural (historical) regime.</p>
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	<p>Species composition and structure have been moderately altered from their historical range at patch and landscape scales. For example:</p> <p>Grasslands – Moderate encroachment of shrubs and trees and/or invasive exotic species.</p> <p>Shrublands – Moderate encroachment of trees, increased shrubs, or invasive exotic species.</p> <p>Forestland/Woodland – Moderate increases in density, encroachment of shade tolerant tree species, or moderate loss of shade intolerant tree species caused by fire exclusion, logging, or exotic insects or disease. Replacement of surface shrub/grass with woody fuels and litter.</p>	<p>Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) are low Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe).</p> <p>Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate.</p>
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	<p>Fire behavior, effects, and other associated disturbances are highly departed (more or less severe).</p> <p>Composition and structure of vegetation and fuel are highly altered.</p> <p>Uncharacteristic conditions range from moderate to high.</p> <p>Risk of loss of key ecosystem components are high.</p>

Source: USFS Fire Regime Condition Class Definition

would be high as vegetation composition, structure, and diversity have been significantly altered by fire exclusion. Consequently, these lands are subject to the greatest risk of ecological collapse as a result of uncontrolled catastrophic wildfire.

The FRCC 2 rated areas have missed more than one fire cycle but are not as vulnerable to the impacts of a natural wildfire. FRCC 1 areas are those at or near their natural fire regime. For the purpose of the CWPP fire risk/WUI impact model, wildland in FRCC 3 category within the WUI will receive a rating of high risk of impact from wildfire, FRCC 2 medium risk, and FRCC 1 low risk for later mapping.

Fire Risk

The WUI risk rating system used three weighted GIS layers (fire hazard model) overlaid on the

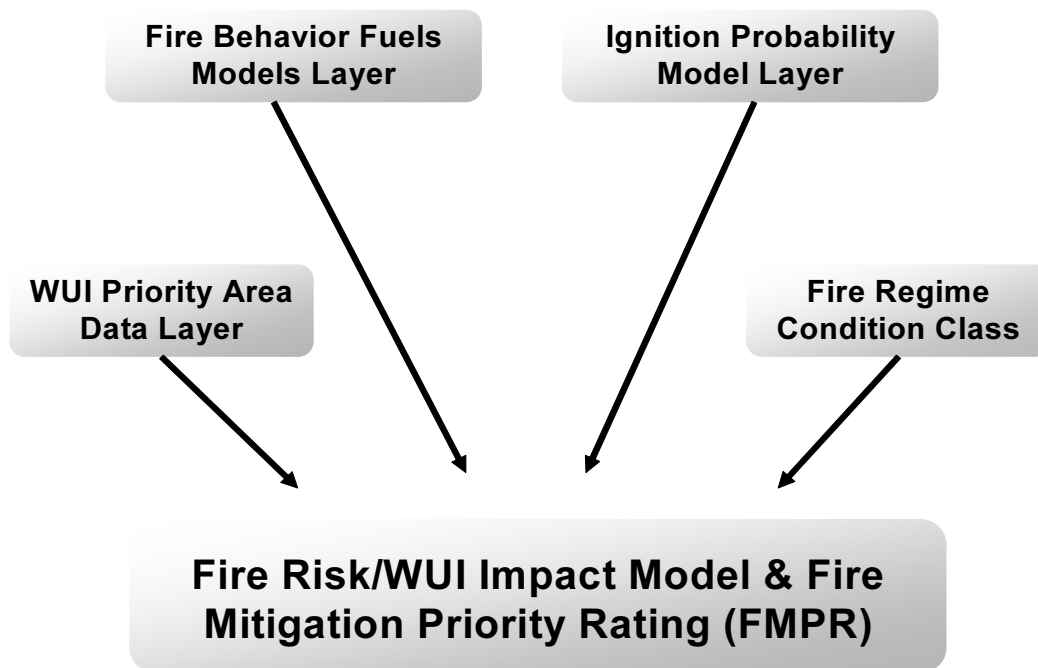


Table 6 – Mitigation Prioritization Rating System Input

WUI priority protection zone map in order to produce a combined fire risk/WUI impact model. Four model data inputs were used: fire behavior fuels models, the ignition probability model, the FRCC, and WUI priority protection zone data (Table 5). Data from each of the four input sets was weighted and passed through a prioritization matrix that generated a score from 4 to 17 (Table 6). The final fire risk/WUI impact map generated from the weighting and scoring is included as Figure 9. Three smaller scale fire risk/WUI impact maps of Jefferson County, with a land survey overlay, are also included as Figures 10 to 15.

To allow prioritization of land management activity it is necessary to develop an association between fire risk/WUI impact model and mitigation need. To this end, a fire mitigation priority-

rating (FMPR) letter scoring scale is linearly related to the fire probability/WUI impact model and is determined as follows: *very high* (risk score >13), *high* (11 to 13), *medium* (8 to 10), or *low* (<8). Second, risk scoring developed in the first step was spatially separated and mapped into the four WUI protection zones derived in the WUI Prioritization Section of this document (Figure 8).

Site- or project-specific FMPR may be generated to further tailor mitigation activity planning and/or project implementation and prioritization. Two methods can be used to determine an on-site FMPR. Method one is used to generate an on-site FMPR through professional estimation of FRCC and Fire Behavior Fuel, then the use of the Ignition Probability Model (Figure 6), and determination of the WUI Priority Zone (Figure 5). A FMPR score may then be tabulated using the matrix in Table 7. A second method of FMPR estimation uses the maps contained in this Plan: pinpoint the site in Figures 9 to 15 and the prioritization equals the FMPR. A fictitious area is scored and summed below using the prioritization matrix.

Fire Mitigation Priority Rating (FMPR) Example

<u>Data/Model Input</u>	<u>Rank</u>	<u>Weighting</u>
WUI Priority Protection Zone	#2	3
Fire Behavior Fuels Model	#5	4
Fire Regime Condition Class	#2	2
Ignition Probability	Medium	2

FMPR Score = 11
or **High Mitigation Priority**

To further tailor the fire risk rating the MT MT DNRC Fire Risk Rating scorecard (MT DNRC 1993) for existing wildland residential developments is included in Appendix C. The MT MT DNRC Fire Risk Rating has been used in the inventory of many western Montana subdivisions and is used to derive a fire risk/priority rating. Completion of the MT MT DNRC risk rating may provide a more thorough understanding of specific area needs. The combination of site- or project-specific FMPR and MT MT DNRC Fire Risk Rating will provide useful information for allocating funding and establishing baseline conditions for project implementation and monitoring, but does not determine what mitigation scheme or activity will be needed to reduce the fire risk.

WUI Priority Zone 4 (Low)																			
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	4	5	6	5	6	7	6	7	8	7	8	9	8	9	10	9	10	11
	Moderate	5	6	7	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12
	High	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13
	Very High	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
WUI Priority Zone 3 (Moderate)																			
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	5	6	7	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12
	Moderate	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13
	High	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
	Very High	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15
WUI Priority Zone 2 (High)																			
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	6	7	8	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13
	Moderate	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
	High	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15
	Very High	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16
WUI Priority Zone 1 (Very-High)																			
Fire Behavior Fuel Model Prioritization		Model 1			Model 8			Model 9			Model 5			Model 2			Model 10		
FRCC Rating		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Ignition Probability	Low	7	8	9	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14
	Moderate	8	9	10	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15
	High	9	10	11	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16
	Very High	10	11	12	11	12	13	12	13	14	13	14	15	14	15	16	15	16	17

Low Priority

Medium Priority

High Priority

Very High Priority



Low Priority



Medium Priority



High Priority



Very High Priority

Table 7 – Fire Mitigation Prioritization Matrix

Priority WUI Area

Jefferson County FMPR areas are broken into four levels of priority there are an estimated 5,923.75 acres of very-high FMPR category area, 99,517.53 acres in high, 299,728.39 acres in medium, and 668,247.12 acres in low (Table 6). Of the six primary landowners the USFS has the largest number of very-high priority area, with 3,229.75 acres the largest number of total priority acres are estimated to fall under private ownership with 446,571.52 acres. Complete FMPR acreages by ownership are listed in Table 8.

Unidentified areas inside the WUI priority assessment have resulted from data gaps in the ignition probability data layer. This missing data results in FMPR model gaps, though relatively insignificant, are illustrated by the difference between total WUI acres (Table 5) and number of priority rated acres (Table 8). Most land not assigned an ignition probability model score is thought to be agricultural land, rock, water, or ice.

Administration Agency / Owner	Very High Priority	High Priority	Medium Priority	Low Priority	TOTAL
All Data in Acres					
Private	482.86	33,760.80	130,012.11	123,667.22	287,922.99
USFS	5,752.46	79,299.87	133,832.95	105,339.86	324,225.14
BLM	342.96	10,325.60	33,497.40	22,541.62	66,707.58
FWP	0.00	56.70	834.86	1,424.67	2,316.23
State	1.80	1,862.84	10,690.77	13,475.94	26,031.35
TOTAL	6,580.08	125,305.81	308,868.09	266,449.31	707,203.29

Table 8 – Fire Mitigation Priority-Rating Acreages

Stakeholder-Identified Areas

In addition to the spatial ratings generated by the FMPR stakeholders have identified areas of high local that they believe deserve special attention. There is considerable concern by residents and local fire authorities that the fire hazard in Rader Creek - Cedar Hills areas is considerable and warrants high priority for fuel hazard reduction. These forested WUI areas will ultimately develop further increases in fire hazard due to forest mortality and rising dead woody fuel loading. Fire hazard and risk reduction measures should be introduced in a timely manner. The potential fire mitigation need and desire associated with these areas may not be adequately represented in the FMPR model.

PLANNED AND COMPLETED MITIGATION ACTIVITIES

Jefferson County has been proactive in its effort to reduce the size and frequency of fires in its WUI area. Specifically, hundreds of WUI protection projects throughout the northern portion of the County have been completed primarily through the efforts of the Jefferson County Fire Council, the Tri-County Fire Working Group (TCFWG), and the County Fire Warden.

Through the effort of the Fire Warden and many others several fire reduction projects have been successfully implemented on hundreds of acres of privately owned land in the northern portion of the Jefferson County. The northern portion of the County is also covered under the TCFWG-sponsored *Regional Community Fire Protection Plan* and Planning area. This higher detail fuels mitigation plan was prepared in collaboration between Lewis & Clark, Jefferson, and Broadwater Counties and targets specific fuels management projects and activities.

Recognizing an increased need for WUI fire hazard mitigation planning, in 2004 the BLM Butte Field Office contracted North Wind, Inc. of Missoula, Montana to complete an inventory of WUI conditions in northern Jefferson County. The WUI assessment included land in close proximity to BLM-managed lands and was conducted to a subdivision/neighborhood level. In this assessment, subdivisions in and near Clancy, Jefferson City, and Montana City were inspected using a fire and fuel hazard assessment process. The following ten factors were inspected during the risk/priority rating:

- Predominant aspect
- Slope of inhabited area
- Elevation
- Fuels type
- Ignition sources
- Structure density
- Fuels proximity
- Building construction materials
- Survivable space
- Existing roads and access
- Fire department response times

The assessment by North Wind, Inc. was completed to allow the BLM to prioritize their management activity. Assigning subdivisions a total hazard ranking was not an objective. Rather, the assessment lumped all northern Jefferson County subdivisions into the “Clancy” Area,” which was found to have 16 moderate and 52 high priority polygons (North Wind 2004). Fox Logic generated subdivision-specific fuels and fire hazard rankings from North Wind’s field inventory data forms 1 and 2, which offer practical information for the CWPP. Of the 58 total subdivision areas surveyed in northern Jefferson County, 24 were ranked at a high fuels hazard and one subdivision was identified as having a high fire hazard (Table 9).

Assessment Area	Fuel Hazard	Fire Hazard	Assessment Area	Fuel Hazard	Fire Hazard
Clancy Area			Montana City Area		
Ambush Ridge	High	Moderate	Jackson Rd.	High	Moderate
<i>Blue Sky Heights</i>			Big Dipper	Moderate	Low
<i>Rock Ridge Roads</i>	High	Moderate	Bridle Bit	High	Moderate
<i>Bear Paw Trail</i>	High	Low	Cloud Ln.	Low	Moderate
Clancy Creek	High	Moderate	Corbin	Low	Low
<i>Ford Ln.</i>	Moderate	Low	Cottonwood	Low	Low
<i>Greenwood Ln.</i>	High	Low	Hanson Rd.	High	Moderate
<i>Haab Ln.</i>	Low	Low	Hills Brothers Rd.	Low	Low
<i>Sleepy Hollow Ln.</i>	Low	Moderate	Johns Rd.	Low	Low
<i>Whitetail Ln.</i>	High	Low	Lost Trail		
Forest Park			<i>Thunder Ridge</i>	High	Moderate
<i>Forest Park Dr.</i>	Low	Low	<i>Running Horse Rd.</i>	High	Moderate
<i>Beaver Ln.</i>	Low	Low	McClellan Creek Rd.	Low	Moderate
<i>Hidden Valley Rd.</i>	Moderate	Moderate	Piney Ridge	Low	Low
<i>Meadow Ln.</i>	Low	High	Prickly Pear	Low	Low
<i>Middle Loop</i>	Low	Moderate	Ridgecrest Ct.	Low	Moderate
<i>Park Ln.</i>	Moderate	Low	Ruby Mtn.	Low	Low
<i>Pine Cone</i>	High	Low	Saddle Mtn. Dr. – East	Low	Low
<i>Pine Ridge Cr.</i>	Low	Low	Saddle Mtn. Dr. – West	High	Moderate
Hanging Tree Gulch	High	Moderate	Sandy Ln.	Low	Moderate
Hwy 282 (east of I-15)	Low	Moderate	Second St.	Low	Low
Lump Gulch			Wildish	Low	Low
<i>Halford Ln.</i>	High	Moderate	Bridger Trail North	Moderate	Moderate
<i>Little Buffalo Creek</i>	High	Moderate	Bridger Trail East	Moderate	Moderate
<i>Rock Mtn. Estates</i>	High	Low	Bridger Trail South	High	Moderate
<i>Sheep Mtn. Rd.</i>	High	Moderate	Stoney Brook	Moderate	Low
Pinecrest Lane	High	Moderate	Hwy 282	Low	Moderate
(Data Source – BLM 2004)					
			Jefferson City Area		
			Finn Gulch	High	Low
			South Main Rd.	High	Moderate
			Wickes Rd. & Wickes	Moderate	Moderate

Table 9 – Northern Jefferson County Subdivision Fire/Fuel Hazard

The North Wind assessment data may prove ultimately useful for individual subdivisions and rural fire departments to plan specific projects. Fox Logic elected not to use the North Wind data in CWPP hazard ranking and WUI impact assessment due to its lack of County-wide coverage. The majority of North Wind's ratings were substantiated by Fox Logic's FMPR ratings.

The CWPP aims to mesh into currently functioning programs. Previously planned WUI mitigation activities in Jefferson County should be fulfilled and effective mitigation efforts or strategies continued while the CWPP is implemented.

IMPLEMENTATION, MONITORING, AND REVIEW

This section outlines recommendations compiled by Fox Logic for the implementation, monitoring, and review of mitigation activities outlined in the CWPP. These recommendations are intended to provide a starting point for the County to build upon. Revisions in the Plan should accommodate changing wildland conditions, new technologies, and evolving priorities within the County. Implementation of on-ground action should be strategic and completed using the FMPR system with one or many of the prescribed activities in the following section of the CWPP.

CWPP management direction will be applied through a dual process of plan implementation and monitoring. Implementation is the responsibility of local government through a designated WUI coordinator, to be developed, to employ the CWPP strategies on priority land areas. The County as a whole has an ongoing responsibility in monitoring how effectively the government is implementing the plan and whether the stated management intent is being achieved. Through ongoing feedback, the implementation of the Plan can be adapted to increase its overall effectiveness.

Activities prescribed in the CWPP will be reflected in resource management, development, and fire mitigation activities as soon as possible. The term of the CWPP is 5 years, with minor review yearly, and a major review beginning at year 4 in preparation for the next plan.

Implementation action will be guided by a time schedule that addresses the highest priority and largest risk areas first, while at the same time (but on a lower priority) treating moderate risk areas over the long term (Table 10). Low-risk areas will receive low treatment priority unless specifically identifies by federal or state agencies or the County WUI Coordinator as requiring treatment.

Implementation

Successfully mitigating WUI wildfire risk and improving structure fire survivability/defense in Jefferson County rests directly on the effective management of the plan and its implementation. The Fire and Wildland-Urban Interface Risk section identified areas where at-risk values are and respective mitigation priority ratings. Strategies discussed in this section will detail the types of activities that can be implemented to mitigate the risk of negative wildfire impact on WUI structures and values. Implementation of the CWPP risk reduction strategy can occur through a number of processes:

- Incremental mitigation activities implemented as specific CWPP projects
- More detailed plans, such as watershed wildfire plans, subdivision wildfire plans
- Subdivision development requirements
- County wildfire safety codes

Further higher detail planning will be necessary before on-ground mitigation action can occur.

Wildland-Urban Interface Fire Hazard Mitigation

WUI protection and fire hazard reduction may be accomplished using different approaches that will be implemented in mitigation activity planning. Six general strategies to hazard reduction

Strategy	Priority	Activity Description
Fuels Management	1	<ul style="list-style-type: none"> Continue/complete current mitigation activities. Initial focus will be on defensible space then removal of commercial value wood, pre-commercial thinning, prescribed burning, stream restoration, and weed control that promote the reduction of fire hazard. Support new hazardous fuels treatment projects within the wildland urban interface and promote Firewise™ principles. Encourage private landowners and agencies to address forest health issues and mitigate fire risk. Encourage the development of subdivision level wildfire assessment and planning. Reduce fuel hazard/WUI risk in the MT HWY 43 corridor.
Education/Prevention	2	<ul style="list-style-type: none"> Introduce/maintain wildfire prevention education and training in the form of public school instruction and media outreach programs. Expand County outreach or extension programs developed by federal and state agencies. Design/conduct WUI residence hazard assessments in coordination with federal and state outreach programs. Promote subdivision wildfire evacuation planning.
Planning	3	<ul style="list-style-type: none"> Assign/Develop a WUI Coordinator designate by contract or from present public servants. Improve road access in constrained areas of the WUI. Install/improve dry hydrants in identified priority locations. Assess and improve bridge capacities in the WUI. Encourage Fuels Treatment Guidelines for new subdivisions. Adopt Montana Fire Protection Guidelines for Wildland Residential Interface Development. Update fire department equipment resource inventories. Establish wildfire safety escape zones.
Development	4	<ul style="list-style-type: none"> Establish guidelines possibly in the form of minimum codes for new structures and subdivision areas to ensure fire safe characteristics (such as the NFPA 1144 standard) and/or implement FireWise standards. Assess WUI residences as part of a real estate transfer program.
Training	5	<ul style="list-style-type: none"> Improve cross-training of firefighters who suppress forest and structure fires.
Inter-agency Cooperation	6	<ul style="list-style-type: none"> Review, improve and revise mutual aid agreements between VFDs, municipal FDs, state, federal, and private firefighting resources where necessary.

Table 10 – Implementation Strategy

and risk mitigation are ranked from high to low priority (Table 10). The highest priority is assigned to strategies that result in the greatest reduction of WUI fire hazard with the least amount of time.

Fuels management, a direct strategy, is assigned the highest priority. The five other strategies, indirect mitigation strategies, will lead to changes in policy and attitudes and ultimately result in the reduction of wildfire hazard and risk exposure. Table 10 also describes activities that are recommended be completed under each of the mitigation strategies.

Fuels mitigation activities are complex and numerous and should be tailored to terrain, habitat type and condition, ecology, or social situation. The following is a non-exhaustive list of activities that may be employed for direct fuels mitigation:

- Commercial and non-commercial timber thinning (including selective and group thinning)
- Pruning
- Under burning
- Creating shaded fuel breaks
- Mulching and chipping
- Grazing
- Brush/grass mowing
- Weed treatment

Many mechanical tools are available to complete the above listed activities. Detailed information on these tools can be found in the *Understory Biomass Reduction Methods and Equipment Catalog* (Windell and Bradshaw 2000). Combinations of activities, techniques, and tools used under the appropriate conditions as guided by the CWPP will reduce the identified fire hazard and risk exposure in an ecologically, environmentally, and socially responsible manner. Where possible, fiber wastes created by mitigation activity should be used for biofuel.



Source: Partners in Protection

Wildland-Urban Interface Structure Fire-Risk Reduction

Much of the previous section addressed the mitigation of wildfire risk and/or impact of wildfire on the greater landscape beyond the individual structures in the WUI. This section builds on the landscape level mitigation strategy by making wildfire risk reduction recommendations that can be applied to individual structures and the area directly surrounding those structures. In the event of a major WUI fire involving numerous buildings, firefighters will likely prioritize (triage) the protection of homes and buildings based on ease of protection. Many of the strategies mentioned previously may also be used to reduce the risk of a potential loss of structure or to increase firefighter safety while engaging fire in the interface.

A series of educational bulletins that include landowner outreach and risk reduction checklists for homes/structures and yards have been included in Appendix C. The items included in the appendix as well as many additional mitigation, emergency preparedness resources, and structural ignition reduction tactics and web links to those resources may be found on the FireWise™ website (www.Firewise.org/) and the Partners in Protection: Fire Smart™ website (www.Firesmart.org/). These resources are tailored guidelines that are based on firefighter

observations, scientific analysis, and actual conditions that have allowed structures and communities to be successfully protected in the face of wildfire. Factors that improve structural survivability and defensibility can include, but are not limited to, FireWise™ concepts that help modify interface forest fuels and fuels configuration, promote the use of building material products and techniques that inhibit fire ignition and/or flammability, and provide educational materials and techniques for education of interface landowners.

Aimed at improving structural survivability, and defense, and reducing structural ignition in the face of imminent wildfire exposure, structural risk reduction tactics described in Appendix C items utilize all six wildfire mitigation strategies prioritized in Table 10.

Specific minimum structure ignition reduction measures that the County WUI Coordinator and fire authorities should recommend for established WUI homes and out buildings include the creation of defensible space areas extending 30 feet from all structures that are clear of debris, watered, mowed, and landscaped with lower flammability vegetation that is pruned and manicured.

Vegetation Flammability

Vegetation research has shown that using the following tree species to make landscaping, forest thinning, and species conversion decisions will lead to less flammable interface forest conditions (Partners in Protection 2003).

Tree Species	Flammability
Aspen	Very Low
Cottonwood*	Very Low
Maple	Very Low
Willow species*	Very Low
Birch	Low
Western larch	Low
Ponderosa pine	Medium
White Pine	Medium
Colorado Blue Spruce*	High
Douglas-fir	High
Engelmann Spruce	High
Grand fir	High
Lodgepole pine	High
Mountain hemlock	High
Sub-alpine fir	High
Western red cedar	High
Western Juniper*	Very High

* Added by Fox Logic

Further recommendations should include fire-resistant decks, porches, and fences, and fire-resistant roof and exterior construction as outlined in Appendix C: The FireWise™ Home.

Fox Logic suggests that the County adopt such a system of fire pre-planning, outreach, and certification for structures and yards in the WUI. FireWise™ is only one example of how a structure-fire risk reduction system can be put together. Such a program could be introduced to property owners by the County and used in conjunction with other fire risk reduction programs such as the National Fire Prevention Association 1144 *Standard For Protection of Life and Property From Wildfire*. As FireWise™ is currently established as a national system of WUI homeowner outreach, education, guidance, and certification in the United States, Fox Logic recommends that as a minimum Jefferson County adopt the guidance principles and techniques it prescribes in an effort to become a FireWise™ certified community. Certification effort can be employed simultaneously with mitigation activities in the WUI areas identified as very-high FMPR.

Stakeholder-Identified Priorities

Stakeholders made many specific suggestions to improve suppression capability and reduce hazards in the County as well as were receptive to guidance offered by Fox Logic for identifying activities and priorities. Forest hazard mitigation was a top priority with other ideas including the installation of dry hydrants in the Basin area, increasing inadequate bridge capacities, and improving roads of inadequate width also being important. Many other prioritized activities are listed in Table 10.

Timeline

CWPP mitigation actions will be implemented according to a time schedule addressing very high- and high-risk areas, including the Rader Creek and Cedar Hills subdivision areas, first during the period beginning 2005 and ending 2010. It is anticipated that 5 percent of the highest risk/priority land area can be treated by the end of the five-year implementation period (Table 11).

The second highest implementation priority is medium-risk areas. Mitigation of these areas will be the focus of attention during the period beginning in 2007 and ending 2010 with the expectation that a 5 percent of the identified at risk land can be treated. Remaining, risk areas identified are the third priority and will be treated during the period beginning 2010 after the first cycle of the CWPP. It is anticipated that long-term maintenance of previously treated areas and treatment of lowest priority areas will be not be engaged during the first iteration of the CWPP. Activity during the five-year life of the Plan will be guided by review and recommendations of the by the Monitoring Committee.

CWPP-authorized fuels mitigation action by state and Federal land management agencies on public land to reduce fuel hazard will place considerable justification on the FMPR system in determining priority land areas. Initially, highest priority will be assigned to very-high and high FMPR area designation projects that meet developed prioritization criteria and fall within the highest FMPR category. Federal and state agency activity planning on public land will meet Montana Environmental Planning Act (MEPA) and National Environmental Planning Act

(NEPA) policy, respectively, including public announcements and scoping documents the agencies use to develop mitigation projects.

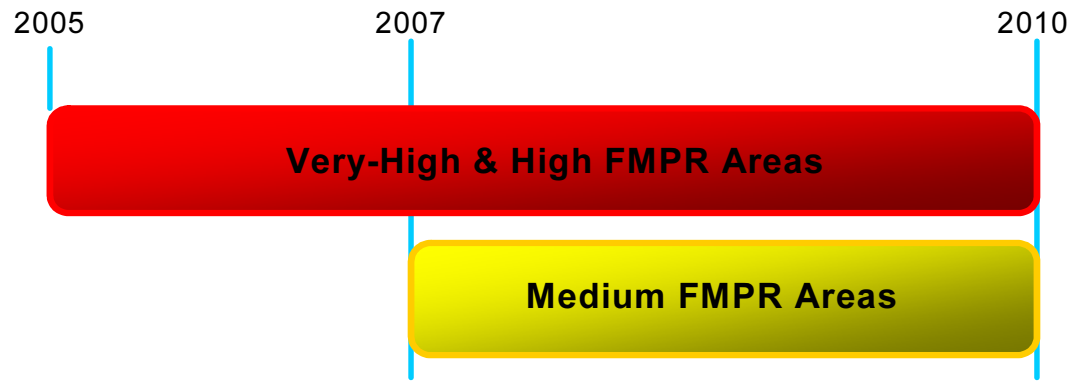


Table 11 – Hazard Mitigation Timeline

Fire mitigation projects on private land follow a similar system of prioritization as outlined for state and federal projects. Private non-industrial forest WUI landowners who want to reduce the risk of loss to wildfire are directed to work with their WUI Coordinator, MT DNRC Extension Forester, or approved private contractor to generate a site FMPR score, or equivalent fire risk rating, for their proposed project area and develop a fuels mitigation plan. The County WUI Coordinator, or equivalent designate, will use site-specific FMPR scores on private properties to develop an unbiased ranking of site fire risk for allocating assistance.

Hazard Reduction Treatment Costs

Financial analysis completed by the USFS for comprehensive restoration of forested areas in western Montana indicated that an average cost of treatment, for returning sustainable forest structure while diminishing crown fire risk was expected to be \$287.00/acre (Fiedler et. al 2004). The analysis derived the cost estimate based on removing late-successional species and reducing density to promote seral species regeneration. The modeled analysis commonly required the cutting of medium- and larger-sized trees with commercial value. This value often covered much or all of the treatment cost. This analysis does not estimate the costs associated with completing hazard reduction in the WUI but the estimate should be representative of costs for WUI areas at further distance from structures.

Costs associated with treatment of areas within close proximity to structures can often be quite expensive. Each area presents unique challenges and costs can vary greatly. Fuels reduction projects recently completed with the assistance of the Headwaters RC&D District, Inc. have averaged approximately \$1,667.00/acre.

Total very-high, high-, and medium- FMPR area is 440,754 acres. To estimate total cost of treatment for all these acres it was first necessary to determine a rough estimate of the total acres that could be treated in close proximity of structures. To complete this task the total number of WUI houses (900)(Census 2000) was arbitrarily estimated to have 5 acres of

treatable forest immediately around the structure results in a total of 4,500 acres. It is assumed that not all houses in the WUI will have five acres of treatable-hazardous forest but it may be assumed that some homes may have 20 acres or more requiring treatment. The remaining land area of elevated mitigation priority, beyond structures, is 436,254 acres.

To estimate WUI treatment cost it was necessary to use both the USFS and the local Headwaters RC&D assisted project cost estimates. The total area that may be treated is 440,754 acres of which it is estimated that 4,500 acres are near structures and 436,254 acres occur at farther distance from structures. Multiplying the acreages by their appropriate cost estimate results in: \$7,501,500 and \$125,204,898. The total estimated WUI treatment cost is \$132,706,398.

Higher Detail Plans

As part of implementation, it will likely be necessary to refine the broad, strategic guidance and risk ratings in the CWPP and develop specific project level plans. One such plan, the TCFWG *Regional Community Fire Protection Plan*, has already been written. Some of these detailed wildfire protection and project plans may include watershed level plans, subdivision plans, other managed area wildfire plans, and future local development plans to address area-specific fire issues.

In all cases, it is expected that the detailed planning initiatives and the resulting products will be guided by and be consistent with the intent of the CWPP. Where more detailed planning reveals new information, a minor revision or amendment to the CWPP may be warranted, in accordance with the criteria outlined in the Minor Revision section that follows.

Roles and Responsibilities

A number of different players are involved in implementation and monitoring of the CWPP. The roles and responsibilities of the various participants in the process are as follows:

Jefferson County Fire Council

The Jefferson County Fire Council (JCFC) includes managers from resource management agencies, disaster and DES coordinator, volunteer fire department chiefs, the fire warden, and county sheriff. The JCFC provides overall coordination, implementation, and strategic fire planning throughout Jefferson County. The JCFC will:

- Coordinate implementation of the Jefferson County CWPP;
- Monitor implementation progress and compliance by agencies and private landowners;
- Interpret plan management priorities and strategies and resolve issues where necessary;
- Oversee the preparation of an annual monitoring report on plan implementation;
- Establish and coordinate the activities of a Monitoring Committee;
- Review recommendations from the Monitoring Committee on proposed plan amendments and provide advice on those amendments to local Government;

- Provide the CWPP document to federal and state resource agency staff, stakeholders, and interested public;
- Advise local government of specific problems regarding plan implementation; and
- Coordinate plan review.

Local Government

The County Commissioners will be kept informed about the implementation of the CWPP and are encouraged to participate in the implementation, ongoing monitoring, and review of the plan.

Local governments are encouraged to inform the JCFC and agencies of settlement planning initiatives that may have implications for implementing the CWPP direction.

Federal and State Agencies

Government agencies are the primary vehicles for the implementation of the CWPP through the ongoing delivery of government programs, policies and initiatives as well as agency application of prescribed fire mitigation activities on public land. The relevant agencies will:

- Carry out responsibilities under the plan;
- Prepare a Tactical Plan detailing tasks arising from CWPP objectives and strategies, including defining priorities for implementation and more detailed planning;
- Provide the CWPP document to resource agency staff, stakeholders, and interested public;
- Advise the JCFC on aspects of plan interpretation and implementation;
- Prepare summaries for the JCFC annual monitoring report;
- Initiate, review and/or provide technical recommendations on proposed revisions and amendments to the plan.

CWPP Monitoring Committee

The role of the CWPP Monitoring Committee, assembled by the JCFC, is to monitor resource management and development activities to assess compliance with, and effectiveness of, activities to meet the intent of the Jefferson County CWPP. The Committee will concern itself with making wildfire mitigation and plan monitoring decisions.

The membership of the Committee is intended to be inclusive and to reflect the diversity of the stakeholders that developed the CWPP.

One of the first tasks of the members of the Monitoring Committee will be to develop a Terms of Reference and Ground Rules. The range of activities of the Committee could include the following:

- To review and provide input to an annual monitoring report;
- To bring any concerns and new information to the attention of the JCFC;
- To provide advice to agencies on plan interpretation and implementation upon request of the JCFC or individual agencies;

- To review and provide recommendations on proposed plan amendments, based on monitoring and implementation reports; and
- To provide community liaison concerning plan implementation and monitoring through the County WUI Coordinator.

Adequate funding may be available and provided through the NFP or other applicable grant sources to support participation in and activities of the Monitoring Committee.

Public

It is recognized that members of the public, in general, are important contributors to the effective implementation and monitoring of the CWPP in partnership with the WUI Coordinator, local government, and the different government agencies. The nature and level of public involvement in more detailed planning will be determined in response to emerging issues, stakeholder interests, and agency resources.

Monitoring

The monitoring phase of the CWPP involves ongoing assessment of how well the primary purpose of the CWPP is being implemented. The public, including the CWPP Monitoring Committee, has an important role to play in monitoring and providing feedback for the CWPP.

There are two aspects to plan monitoring:

- 1) An assessment of CWPP implementation through agency projects and programs; and
- 2) The effectiveness of plan implementation in achieving the management intent of the plan. If the desired outcomes of the CWPP are not being achieved, it may be necessary to consider revisions to the plan.

Section 102(g)(5) of the HFRA directs the USFS and BLM to “establish a collaborative multi-party monitoring, evaluation, and accountability process in order to assess the positive or negative ecological and social effects of authorized hazardous fuel reduction projects...” It is recommended that the JCFC Monitoring Committee participate in this multiparty monitoring effort.

Adaptive Management

The risk assessment, mitigation prioritization, and implementation plan in the Jefferson County CWPP has been developed using the best information and knowledge available at this time. At the same time, there is inevitably a level of uncertainty in the ultimate effectiveness of management recommendations. Therefore, the CWPP endorses a process of adaptive management, in which implemented activities are monitored for effectiveness and changes are enacted when and where required. The use of an adaptive management monitoring strategy will allow continual improvement of management policies and practices. By monitoring key response indicators over time and incorporating new information and knowledge, the JCFC, local government, and agencies will be able to analyze the outcome of their fire mitigation

activity in light of the original CWPP intent and incorporate those results into future planning and approach to best practices in the WUI.

Annual Monitoring Report

Accountability to the plan is described in an Annual Monitoring Report, in which individual state and federal agencies and the WUI Coordinator report on implementation progress and the status of completion of projects or actions identified in the CWPP Implementation section. The Report also summarizes, through the evaluation of performance indicators, the achievement of expected outcomes for the CWPP.

The JCFC Monitoring Committee is responsible for preparing the Annual Monitoring Report. Those agencies and the WUI Coordinator responsible for implementing the CWPP objectives contribute annual reports on their progress of CWPP projects and activities.

The Annual Monitoring Report will be presented to the JCFC for review at an annual meeting to ensure that projects and programs are being implemented in accordance with the management direction and intent of the CWPP. As part of the review process, the Monitoring Committee may make recommendations on plan implementation and amendments. The JCFC will report back to the Monitoring Committee on how the recommendations of the Committee have been addressed.

Plan Amendments

Proposed revisions to the Plan as identified by the CWPP Monitoring Committee, agencies, or through more detailed planning will be identified in the Annual Monitoring Report. The JCFC will review and approve minor revisions to the plan, but major amendments will need to be approved by the three principal stakeholders.

Minor Revisions

The Monitoring Committee will make recommendations for minor revisions to the plan to the JCFC. With JCFC approval, minor revisions will be documented in the annual monitoring report.

Examples of minor revisions include but are not limited to:

- Revised priorities for implementation;
- Refinements to objectives and strategies as suggested by more higher plans; and
- Plan changes required to conform to new laws and regulations.

Major Revisions

A major revision to the Plan will be referred to as an amendment. The following are considered amendments to the plan:

- Major revisions to intent or prescribed mitigation activities;
- Changes to the WUI definition and boundaries; or
- Changes to WUI value priority zone boundaries.

Although the CWPP Monitoring Committee does not have the mandate to make land use planning decisions, it can make recommendations for revisions or amendments to the plan. Any proposed amendments would be identified in the Annual Monitoring Report and at the annual Monitoring Committee meeting. The JCFC will decide when an amendment is required and will define and coordinate the process consistent with existing County regulations and policies.

Plan Review

The Jefferson County CWPP is subject to a minor review yearly and a comprehensive review to commence in the fourth year of the plan and be completed by the fifth year. The JCFC may also consider annually whether or not a comprehensive review is warranted prior to the scheduled plan review.

Interpretation

From time to time, the public, local government, or agencies may become concerned about how the plan is being interpreted or about specific land and resource practices. In all instances of concern, the issues will be dealt with in a cooperative manner.

Interpretation of Priorities, Activities, and Strategies

The priorities, strategies, and activities in this CWPP should be interpreted at a broad or strategic level wherever possible. Where a concern is raised over the interpretation and/or implementation of priorities, strategies, or activities the concern should be addressed directly to the affected agency or the WUI Coordinator. The agency or WUI Coordinator will respond to the concern in writing, consulting with the JCFC for guidance where necessary.

If the matter is not satisfactorily resolved, the concern will be forwarded to the JCFC for resolution. The JCFC will determine if the decision is consistent with the intent of the CWPP. If it is consistent, no further action will be taken. If it is not, the agency or the WUI Coordinator will be directed to revise the decision to be consistent with the intent of the plan. The JCFC may consult with the Monitoring Committee on issues of plan interpretation.

Assistance Programs

Assistance is available from the federal and state government to non-industrial private landowners, landowner cooperatives, tribes, fire departments, state land managers, and state, city and county government. The purpose of these programs is to provide financial aid and equipment for the purpose of enhancing habitat, reducing wildfire risk, offering education, and aiding in future planning. (Table 12). Federal and state fuel reduction assistance and grant programs within Jefferson County will prioritize mitigation opportunity on public and/or private lands based largely as identified by the FMPR as described in the Mapping/Risk Mitigation Priority Rating section of this Plan. Initially, highest priority will be assigned to very-high and high FMPR area projects that meet developed prioritization criteria and grant objectives and fall within the highest FMPR category. Grant prioritization criteria will be further evaluated on an annual basis.

Note- Grant funding opportunities are not guaranteed and may vary from year to year.

Program	Description
Rural Fire Assistance	<p>Source: National Fire Plan – Department of Interior</p> <p>Description: Provides funds to rural fire departments for wildfire fighting; also provides wildland fire equipment, training and/or prevention materials.</p> <p>More info: www.dnrc.state.mt.us/forestry/dnrcfiresite/volfire.htm#rfa</p>
Fire Hazard Mitigation Assistance	<p>Source: US Forest Service</p> <p>Description: USFS grants to state foresters through state and private funding, under authority of Cooperative Forestry Assistance Act. Intended to maintain and improve protection efficiency and effectiveness on non-federal lands, training, equipment, preparedness, prevention and education.</p> <p>More Info: www.fireplan.gov; Paula Rosenthal, MT DNRC SW Land Office</p> <p>Source: National Fire Plan</p> <p>Description: State fire mitigation assistance grant funds are targeted at state and local fire services, county emergency planning committees, and private landowners. Assistance for projects to reduce hazard fuels in the WUI.</p> <p>More Info: www.fireplan.gov, www.fs.fed.us/r4 and www.dnrc.state.mt.us/forestry/dnrcfiresite</p>
Volunteer Fire Department Assistance	<p>Source: US Forest Service</p> <p>Description: State and private grants under the authority of Cooperative Forestry Assistance Act provided to state foresters for distribution to municipal and volunteer fire departments. Provides monetary and technical assistance in organizing, training, and purchasing equipment to enable them to effectively meet their structure and WUI protection responsibilities.</p> <p>More Info: www.fs.fed.us/fire/partners/vfa and www.dnrc.state.mt.us/forestry/dnrcfiresite/</p>
Economic Action Program	<p>Source: US Forest Service</p> <p>Description: A USFS, state and private program with involvement from local Forest Service offices to help identify economic development projects. Addresses long-term economic and social health of rural areas; assists the development of enterprises through diversified uses of forest products, marketing assistance, and utilization of hazardous fuel byproducts.</p> <p>More Info: www.fs.fed.us/r1-r4/spf/montana/</p>
Forest Land Enhancement Program (FLEP)	<p>Source: US Forest Service</p> <p>Description: USDA grants to private non-industrial landowners under the authority of the 2002 Farm Bill. FLEP purposes include: 1) Enhance the productivity of timber, fish and wildlife habitat, soil and water quality, wetland, recreational resources, and aesthetic values of forest land through landowner cost share assistance, and 2) Establish a coordinated, cooperative federal, state, and local sustainable forestry program to establish, manage, maintain, enhance, and restore forests on non-industrial private forest land.</p> <p>More info: www.usda.gov/farmbill</p>

Table 12 – Assistance Opportunities

Program	Description
Federal Excess Property	<p>Source: US Forest Service Description: Provides assistance to state, county, and local governments by providing excess federal property (equipment, supplies, tools) for wildland and rural community fire response.</p> <p>More info: www.fs.fed.us/fire/partners/fepp/</p>
Forest Stewardship Program	<p>Source: US Forest Service Description: Provides grant funding to enable preparation of forest management plans on state, private, and tribal lands to ensure effective and promote efficient hazardous fuel treatment.</p> <p>More info: www.fs.fed.us/r1-r4/spf/montana/</p>
Rural Community Assistance	<p>Source: US Forest Service Description: Provides grant funds to rural organizations with involvement of local Forest Service offices for the development of community strategic action and fire risk management plans to increase community resiliency and capacity.</p> <p>More info: Dean Graham, Regional RCA Coordinator at 406-329-3230</p>
Firefighters Assistance	<p>Source: Federal Emergency Management Agency and US Fire Administration Program Description: Provides grant assistance to municipal and volunteer fire departments to help improve fire fighting operations, services, and provide equipment.</p> <p>More info: www.usfa.fema.gov/</p>
Montana Forest Stewardship Program	<p>Source: Montana Department of Natural Resources and Conservation Description: Program provides grant funding for non-industrial private forest landowners in meeting the demand for wood products and providing high quality management of their resources and develop forestry employment for the local community.</p> <p>More info: www.fs.fed.us/r1-r4/spf/montana/factsheet/02landownerassistance.htm</p>
Community Facilities Loans and Grants	<p>Source: Rural Housing Service (RHS) US Dept. of Agriculture Description: Provides grants (and loans) to cities, counties, states and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; including the purchase of fire-fighting equipment for rural areas. No match is required.</p> <p>More info: www.rurdev.usda.gov; or local county Rural Development office.</p>
Sale of Federal Surplus Personal Property	<p>Source: General Services Administration Description: This program sells, by competitive bid, surplus federal government equipment to individuals, businesses, and organizations. Normally, there are no use restrictions on the property purchased.</p> <p>More info: www.gsa.gov</p>
Reimbursement for Firefighting on Federal Property	<p>Source: US Fire Administration, Federal Emergency Management Agency Description: Program provides reimbursement to fire service organizations that have engaged in firefighting operations on federal land. Payments can be for direct expenses and direct losses.</p> <p>More info: www.fema.gov/</p>

Table 12 – Assistance Opportunities continued

Program	Description
Fire Management Assistance Grant Program	<p>Source: FEMA</p> <p>Description: Readiness, Response and Recovery Directorate provides grants to states, tribal governments, and local governments for the mitigation, management and control of any fire burning on publicly (nonfederal) or privately owned wildland that threatens such destruction as would constitute a major disaster. The grants are made in the form of cost sharing with the federal share being 75 percent of total eligible costs. Grant approvals are made within 1 to 72 hours from time of request.</p> <p>More info: www.fema.gov/</p>
Hazard Mitigation Grant Program	<p>Source: Federal Insurance and Mitigation Administration, FEMA</p> <p>Description: Provides states and local governments with financial assistance to implement measures to reduce or eliminate damage and losses from natural hazards. Funded projects have included vegetation management projects.</p> <p>More info: www.fema.gov/</p>

Table 12 – Assistance Opportunities continued

ACTIVE STAKEHOLDERS AND PLAN DEVELOPMENT

The Jefferson County CWPP generation process has included the participation of many community entities. Generation of this plan has included the following primary stakeholders:

- Fire Council
- Commissioners
- Disaster and Emergency Services
- Bureau of Land Management
- United States Department of Agriculture: Forest Service
- Montana Department of Natural Resources

Fox Logic invoked discussions with and received feedback from the public, private organizations, and federal, state, and local agencies to identify wildfire risks, priority areas, priority projects, and mitigation activities. Planning was based on verbal input from stakeholder meetings held during the summer/fall 2004 and winter/spring 2005 and written responses submitted to Fox Logic. Input from public stakeholder groups was additionally encouraged through solicitation letters sent directly to possible stakeholder groups and public notices published in local newspapers (Appendix A and Appendix B).

In early-August 2005 a first version of the Final Draft CWPP was circulated to four core stakeholders for review and comment. In early-September 2005, after recommended changes were received and incorporated from core stakeholders, a completed Final Draft of the CWPP was posted via the Internet on the Fox Logic website. Notification of the Internet posting was issued by email/traditional mail notice to all previously identified stakeholders. Finally, copies of the completed CWPP were sent to the HRC&D office in Butte and the County DES Office in Boulder in late September 2005.

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FIGURES

APPENDICIES

Appendix A

Stakeholder Outreach

PRESS RELEASE

Jefferson County, Montana is developing a Community Wildfire Protection Plan (CWPP) to be completed no later than September 30, 2005.

The Community Wildfire Protection Plan (CWPP) is a tool designed for at-risk wildland-urban interface (WUI) communities to pre-plan and improve their capability to negate or survive wildfire. The CWPP content must fulfill three stipulations of the United States Healthy Forests Restoration Act (HFRA) of 2003. The HFRA provides funding for wildland-urban interface mitigation/defensibility improvements in communities at-risk to wildfire if they fulfill the following:

- **Develop a CWPP collaboratively with local government, local fire department(s), and the MT DNRC, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community;**
- **Identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure; and**
- **Recommend measures to reduce structural ignitability throughout the at-risk community.**

Interested groups wanting to contribute pertinent and valid information in this matter may submit a written summary to Fox Logic, LLC, a resource management and planning company contracted to facilitate the development of the Jefferson County CWPP. Information and recommendations received will be carefully evaluated for relevance before being included in the final document. Submissions should be received no later than 1 February 2005 and should be addressed to:

**Fox Logic, LLC
Attn: Russell F. Fox
P.O. Box 411
Florence, MT 59833
Or**

E-mailed to: foxrus@hotmail.com

Date Posted: 3 December 2004



November 18, 2004

[Stakeholder Address]

RE: Jefferson County - Community Wildfire Protection Plan Preparation

Dear [Stakeholder]:

The Community Wildfire Protection Plan (CWPP) is a tool designed for at-risk wildland-urban interface (WUI) communities to pre-plan and improve their capability to negate or survive wildfire. The CWPP content must fulfill three stipulations of the United States Healthy Forests Restoration Act (HFRA) of 2003. The HFRA provides funding for wildland-urban interface mitigation/defensibility improvements in communities at-risk to wildfire if they fulfill the following:

- Develop a CWPP collaboratively with local government, local fire department(s), and the MT DNRC, in consultation with interested parties and the Federal land management agencies managing land in the vicinity of the at-risk community;
- Identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment on Federal and non-Federal land that will protect one or more at-risk communities and essential infrastructure; and
- Recommend measures to reduce structural ignitability throughout the at-risk community.

It is hoped that the [Stakeholder] would provide ideas, assessments, goals, and objectives pertaining to the CWPP for the County. As a Stakeholder in the County's CWPP your ideas and concerns are important to the entire Community and your response will enhance the ability to prevent catastrophic WUI wildfire, better protect wildland firefighter lives, and reduce the socioeconomic impact of fire.

Please accept this letter as an invitation for [Stakeholder]'s participation in the development of the CWPP for Jefferson County. I need to get your vision for the CWPP document by no later than January 15, 2004 in order to incorporate it into the final document. Should you have any questions or concerns please call me at (406) 273-4317 / (406) 370-8539 or email me at foxrus@hotmail.com.

Sincerely,

Russell F. Fox, CF
Owner-Manager

Fox Logic, LLC - Community Wildfire Protection Plan Information Sheet & Stakeholder Questionnaire

Overview

CWPP is a tool for at-risk wildland-urban interface communities to pre-plan and improve their capability to negate or survive wildfire.

Is developed in the context of the collaborative agreements and guidance established by the Wildland Fire Leadership Council and agreed to by the local government, local fire department, and state agency responsible for forest management, in consultation with interested parties and the federal land-management agencies that manage land in the vicinity of an at-risk community;

Identifies and sets priorities for areas needing hazardous-fuel-reduction treatments and recommends the types and methods of treatment on federal and non-federal lands that will protect one or more at-risk communities and their essential infrastructure; and

Recommends measures to reduce the chance that a fire will ignite structures throughout an at-risk community.

Why a CWPP:

- Provides financial assistance for authorized hazardous-fuel-reduction projects on non-federal land in the Community-at-risk will be allocated by federal agencies based on CWPP recommendations;
- Allows Federal land Management agencies to give priority to projects “that give(s) priority to authorized hazardous fuel reduction projects that provide for protecting at-risk communities or watersheds or that implement CWPPs”

Healthy Forest Restoration Act (HFRA)

Purpose:

“...to reduce wildfire risk to communities, municipal water supplies, and other at-risk federal land through a collaborative planning, prioritizing, and implementing hazardous fuel reduction projects...”

Wildland Urban Interface

The Healthy Forest Restoration Act defines the wildland urban interface (in absence of a CWPP defined WUI) as:

- an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan; or
- in the case of any area for which a community wildfire protection plan is not in effect:
 - An area extending 1 mile from the boundary of an at-risk community;
 - An area within 1-1/2 miles of the boundary of an at-risk community including land that:
 - has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community ;
 - has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or
 - is in condition class 3 as documented by the Secretary in the project-specific environmental analysis; and
 - an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at- risk community.

Stakeholder Questionnaire continued

Your Involvement is needed to...

Define the Local Wildland Urban Interface

Each county has its own set of variables that the HFRA WUI definition may not address (How do you want to define your WUI?). Factors to consider include:

- Population Density
- Spotting Distances
- Critical Infrastructure
- Evacuation Routes

Identify Risks

Local knowledge will enhance/supplement risk mapping (metrics). What are the obvious WUI risks that you believe should not be left out? (Examples)

- Response time of suppression resources?
- Forest disease/insect outbreak areas?
- Availability of needed or additional resources?
- Public evacuation issues? (WUI Egress/Ingress)
- Past problem areas?

CWPP Priority Area/Zone Identification

Where will be the high, medium, and low priority risk areas/zones be in the WUI? (Examples)

- Travel corridors protection
- Municipal watershed protection
- Power grid protection
- Communication system protection
- Public/homeowner education

Identify Project Priorities

What are the mitigation projects and their order of priority (high, medium, low) that will mitigate identified risks in the priority areas? (Examples)

- Defensible space creation
- Reduce risk to public and firefighter safety
- Work across jurisdictional boundaries
- Reduce risk of Crown Fires/Catastrophic Fires
- Slow rate of wildfire spread

Identify Project Tasks

What type of tasks will be undertaken to reduce wildfire risk in priority areas/zones? (Examples)

- Cutting and hand piling
- Lop and scatter
- Dispersed Treatments
- Fuel Breaks
- Education
- Underburning

**Fox Logic, LLC, intends the above points only for Stakeholder guidance.*

FoxLogic, LLC
Natural Resource
Management & Planning
PO Box 411 Ph: (406) 273-4317
Florence, MT 59833 Cell: (406) 370-8539



DATE, 2005

«Department»
ATTN: «First_Name» «Last_Name»
«Job_Title»
«Address»

RE: Jefferson County - Community Wildfire Protection Plan 1st Final Draft Review

Dear «Title» «Last_Name»:

First I would like to thank you for your participation as a stakeholder in the development of the Jefferson County Community Wildfire Protection Plan (CWPP). It is your involvement that has helped design this valuable tool that will improve wildfire defense, structure survivability, and human safety in Jefferson County's at-risk wildland-urban interface (WUI).

I have enclosed the 1st Final Draft of the Jefferson County CWPP on CD ROM for your review. To ensure the document reflects an appropriate interpretation of County wildfire risk and hazard mitigation priorities, it is hoped that you would take some time to review this initial Final Draft Plan.

I understand your time is valuable but hope you will continue your participation in the CWPP development process by providing me with your evaluation of the Draft Plan. To aid me in assessing how well the draft meets the spectrum of stakeholder desires and expectations for wildfire mitigation in the WUI I have attached a CWPP evaluation sheet that you may complete as you review of the document. Please send the completed evaluation with your comments back to me by August 19, 2005.

As a CWPP stakeholder your participation in the development of the Jefferson County CWPP is invaluable. Should you have any questions or concerns please call me at (406) 273-4317 / (406) 370-8539 or email me at foxrus@hotmail.com. In case you do not have access to a computer for Plan review please call and I will send a hard copy to you.

Best Regards,

Russell F. Fox, CF
Owner-Manager

Enclosure.
Attachment.

Stakeholder CWPP Evaluation Sheet

CWPP SECTION

Rating (circle one)

EXECUTIVE SUMMARY

comments:

Good	Fair	Poor
------	------	------

BACKGROUND

comments:

Good	Fair	Poor
------	------	------

VALUES AT-RISK

comments:

Good	Fair	Poor
------	------	------

FIRE PREPAREDNESS

comments:

Good	Fair	Poor
------	------	------

FIRE AND WILDLAND-URBAN INTERFACE RISK

comments:

Good	Fair	Poor
------	------	------

PLANNED AND COMPLETED MITIGATION ACTIVITIES

comments:

Good	Fair	Poor
------	------	------

IMPLEMENTATION, MONITORING, AND REVIEW

comments:

Good	Fair	Poor
------	------	------

ACTIVE STAKEHOLDERS AND PLAN DEVELOPMENT

comments:

Good	Fair	Poor
------	------	------

FIGURES

comments:

Good	Fair	Poor
------	------	------

APPENDIX

comments:

Good	Fair	Poor
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Please use back of pages for further comment.

Appendix B

Stakeholder Contact List

Contact	Information
BLM	Butte District, Butte Field Office 106 North Parkmount, Butte, MT 59701
	Contact: Terina Mullen, Fire Mitigation/Education Specialist
	Butte District Office 106 North Parkmount, Butte, MT 59701
	Contact: John Thompson, FMO
USFS	Helena National Forest, Helena District Office 201 Poplar, Helena, MT 59601
	Contact: Daune Harp, District Ranger
	Beaveread-Deerlodge National Forest: Butte Ranger District 1820 Meadowlark Ln, Butte, MT 59701
	Contact: Steve Egeline
	Beaverhead-Deerlodge National Forest: Jefferson Ranger District 3 Whitetail Road, Whitehall, MT 59759
DNRC	Contact: Terry Sexton
	Anaconda Fire Unit 7916 Hwy 1 W., Anaconda, MT 59711
MT FWP	Contact: Terry Vaughn, Anaconda Unit Fire Supervisor
	Butte Field Office 1820 Meadowlark Lane, Butte, MT 59701
	Contact: Kris Douglas
Fire Council	Jefferson County Rural Fire Council PO Box H, Boulder, MT 59632
	Contact: Rick Strauss
DES	County Disaster and Emergency Services Office PO Box H, Boulder, MT 59632
	Contact: Sally Buckles, County Coordinator
County Commissioners	County Courthouse PO Box H, Boulder, MT 59632
	Contact: Tom Lythgoe, Chuck Notbohm, Ken Weber
Fire Warden	2850 Grizzly Gulch Dr., Helena, MT 59601
	Contact: Pat McKelvey
Sheriff	Jefferson County Sheriff's Office PO Box 588, Boulder, MT 59632
	Contact: Craig Doolittle, Sheriff
Sierra Club	Headwater's Group P.O. Box 1290, Bozeman, MT 59715
	Contact: Christine Phillips
Media	Readers' Alley P.O. Box 4249, Helena, MT 59604
	Contact: Dave Shors, Editor
	Boulder Monitor P.O. Box 66, Boulder, MT 59632-0066
	Contact: Jan Anderson, Editor
	Whitehall Ledger, Inc. PO Box 1169, Whitehall, MT 59759-1169
	Contact: Glen Marx, Editor
	The Montana Standard 25 W. Granite St., Butte, MT 59701
	Contact: Gerry O'Brien, Editor

Appendix C

Existing Development DNRC Risk Rating System

EXISTING DEVELOPMENT
FORM C -RATING FORM (Rev. 3/93)

RATING AREA:

DATE:

RATED BY:

ROADS

ROAD ACCESS - Items 1 and 2

- Multiple primary access roads = 0
- Two primary access roads = 1
- One-way primary + one alternative access road = 2
- One-way in/out = 3
- No primary access roads = 4

ROAD SURFACE, WIDTH, PRIMARY ACCESS ROUTES - Item 3

- > 18' Road Surface + Shoulder = 1
- 18' Road Surface + Shoulder = 2
- 16 - < 18' Road Surface + Shoulder = 3
- < 16' Road Surface + Shoulder = 4

MAXIMUM ROAD GRADE - Item 4

- 0-5% = 1
- 6-8% = 2
- > 8 - 10% = 3
- > 10% = 4

SECONDARY ROAD ENDINGS - Item 5

- Loops or > 90' Diameter Cui de Sacs = 1
- Cul de Sac Diameter 70-90' = 2
- Cul de Sac Diameter < 70' = 3
- Dead Ends - No Cui de Sac = 4

BRIDGES - Items 6 and 7

- No Bridges = 1
- 40 Ton(+) limit on access bridges = 2
- 20-39 Ton limit on all access bridges = 3
- < 10 Ton limit any access bridge = 4

TOPOGRAPHY

SLOPE - Item 8

- 0-10% = 1
- 11-10% = 2
- 11-30% = 3

- > 30% = 4

ASPECT - Item 9

- North (315 degrees through 45 degrees) = 0
- East (46 degrees through 135 degrees) = 1
- Level = 2
- West (226 degrees through 315 degrees) = 3
- South (136 degrees through 225 degrees) = 4

MOST DANGEROUS FEATIJRE . Item" 10

- None = 2
- Atijacent Steep Slopes = 4
- Draws/Ravines = 6
- Chimneys, Cauyons, Saddles = 8

FUELS

FUEL TYPE - Item 11

- Grass around> 90% of structures = 5
- Low brush field, or open timber around> 10% of structures = 10
- Dense conifer or brush field exist around > 10% of structures = 15
- Slash, bugkill, dense lodgepole pine exist around > 10 of structures = 20

RISK SOURCES - total from Item 12

- 0-4 Risk Sources Present = 5
- 5-8 Risk Sources Present = 10
- 9-12 Risk Sources Present = 15
- 13+ Risk Sources Present = 20

ELECTRICAL UTILITIES. Item 13

- All Underground = 0
- Above Ground/Underground Combination (Well Maintained) = 10
- Above Ground (poorly Maintained) = 20

HOMES

ROOF MATERIAL — Item 15

- 90-100% of homes have metal, composition, tile or other fire resistant roofing = 5
- 80-89% of homes have metal, composition, tile or other fire resistant roofing = 10
- 75-79% of homes have metal, composition, tile or other fire resistant roofing = 15
- < 75% of homes have metal, composition tile or other fire resistant roofing = 20

UNENCLOSED BALCONIES, DECKS, EAVES, STILTS, ETC. - Item 16

- < 10% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 1
- 10-20% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 2
- 21-25% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 3
- > 25% of homes have unenclosed balconies, decks, eaves, stilts, etc. = 4

DENSITY OF HOMES – Item 17

- (For 0-30% slope)
 - > 100' between homes = 1
 - 60-100' between homes = 3
 - < 60' between homes = 5
- (For 31-50% slope)
 - > 100' between homes = 2
 - 60'100' between homes = 4
 - < 60' between homes = 6

LANDSCAPING - Item 18

- 76-100% homes meet the fire-resistant landscaping guidelines in the Appendix F = 2
- 51-75% homes meet the fire-resistant landscaping guidelines in the Appendix F = 4
- 26-50% homes meet the fire-resistant landscaping guidelines in the Appendix F = 6
- 0-25% homes meet the fire-resistant landscaping guidelines in the Appendix F = 9

WATER SUPPLY

HYDRANTS – Items 19, 20 and 21

- 500 GPM hydrants available on < 660' spacing = 2
- 00 GPM hydrants available = 4
- < 500 GPM hydrants available = 6
- No hydrants = 8

DRAFT SOURCES – Item 22

- Accessible Sources Available Within Hoselay Distance = 2
- Draft Sources Available Within 5 mi. via primary access roads = 4
- Draft Sources Require Development = 6
- Draft Sources Unavailable = 8

HELICOPTER DIP SPOTS – Item 23

- Under 2 min. turnaround «t mi.) = 1
- Within 2-5 min. turnaround (1-2 mi.) = 2
- Within 6 min. turnaround (3 mi.) = 3
- Beyond 6 min. turnaround or Unavailabl. = 4

STRUCTURAL FIRE PROTECTION - Items 24 and 25

- ≤ 5 min. from fire department = 5; if VFC = 10
- 6-15 min. from fire depaa lment = 10; if VFC = 15
- 16-30 min. from fire department = 15; if VFC = 20
- No RFD, FSA, municipal fire district or VFC? = 20

HOMEOWNER CONTACT - Items 26 and 27

- Central contact - formal/well organized group = 5
(e.g., a homeowners assoc.)
- Less central contact - an informal/loosely organized = 10
group (e.g., a civic club or development office)
- Multiple groups - different contacts representing = 15
different parts of the community
- No organized contacts = 20

FIRE OCCURRENCE - Item 28

- .00 - .10 Fires/1000 ac./10yr. = 5
- .11 - .20 Fires/1000 ac./10yr. = 10
- .21 - .40 Fires/1000 ac./10yr. = 15
- .40 Fires/1000 ac./10yr. = 20

TOTAL SCORE

≤ 110	low risk – low priority
111-135	moderate risk – moderate priority
136-150	high risk – high priority
151-170	very high risk – very high. priority
≥171	extreme risk – extreme priority

Appendix D

Structural Risk Reduction Resources

FIREWISE CONSTRUCTION

To create your FIREWISE structure, remember that the primary goals are fuel and exposure reduction.

Use construction materials that are fire-resistant or non-combustible whenever possible.

Consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, or cement and concrete products for roof construction.

Construct a fire-resistant sub-roof for added protection.

Use fire resistant materials such as stucco or masonry for exterior walls. These products are much better than vinyl which can soften and melt.

Consider both size and materials for windows; smaller panes hold up better in their frames than larger ones; double pane glass and tempered glass are more effective than single pane glass; plastic skylights can melt.

Prevent sparks from entering your home through vents, by covering exterior attic and underfloor vents with wire mesh no larger than 1/8 of an inch.

Keep your gutters, eaves and roof clear of leaves and other debris.

Clear dead wood and dense vegetation within at least 30 feet from your house, and move firewood away from your house or attachments like fences or decks.

Any structure attached to the house, such as decks, porches, fences and sheds should be considered part of the house. These structures can act as fuel or fuel bridges, particularly if constructed from flammable materials. Therefore, consider the following:

If you wish to attach an all-wood fence to your home, use masonry or metal as a protective barrier between the fence and house.

Use non-flammable metal when constructing a trellis and cover with high-moisture, fire-resistant vegetation.

Prevent combustible materials and debris from accumulating beneath patio deck or elevated porches; screen underneath or box in areas below the deck or porch with wire mesh no larger than 1/8 of an inch.

WWW.FIREWISE.ORG

BEWARE & PREPARE

Firefighters need your help. Use these tips to **PREPARE** your home and **PROTECT** your family and pets. **BEWARE** of accidentally starting a wildfire!



FOR MORE INFORMATION, VISIT THESE HELPFUL WEBSITES:

USDA FOREST SERVICE

www.fs.fed.us

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT
BUREAU OF INDIAN AFFAIRS
FISH & WILDLIFE SERVICE
NATIONAL PARK SERVICE

www.doi.gov/bureaus.html

NATIONAL ASSOCIATION OF STATE FORESTERS

www.stateforesters.org

NATIONAL FIRE PROTECTION ASSOCIATION

www.nfpa.org

U.S. FIRE ADMINISTRATION

www.usfa.fema.gov

FEDERAL EMERGENCY MANAGEMENT AGENCY

www.fema.gov

FOR MORE INFORMATION CONTACT:

FIREWISE COMMUNITIES

1 BATTERY MARCH PARK - QUINCY, MA 02269

www.firewise.org

FIREWISE LANDSCAPING

To create a landscape that will make your home less vulnerable to wildfire, the primary goal is fuel reduction. Think of the area around your home in zones. Zone 1 is closest to the structure, Zone 4 is the farthest away.

Zone 1 This well-irrigated area encircles the structure for at least 30 feet on all sides, providing space for fire suppression equipment in the event of an emergency. Plants should be limited to carefully spaced fire resistant tree and shrub species.

Zone 2 Fire resistant plant materials should be used here. Plants should be low-growing, and the irrigation system should extend into this section.

Zone 3 Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.

Zone 4 This furthest zone from the structure is a natural area. Thin selectively here and remove highly flammable vegetation.

Also remember to:

Carefully space the trees you plant.

Take out the "ladder fuels" — vegetation that serves as a link between grass and tree tops. These fuels can carry fire from vegetation to a structure or from a structure to vegetation.

When maintaining a landscape:

Keep trees and shrubs pruned. Prune all trees six to 10 feet from the ground.

Water and maintain your lawn regularly.

Mow dry grass and weeds.

Dispose of cuttings and debris promptly.

Landscapes with less-flammable plants. Contact your local state forester, county extension office or landscape specialist for plant information.

WWW.FIREWISE.ORG

DEFENSIBLE SPACE

Do you have at least 30 ft of space surrounding your home that is Lean, Clean and Green?

The objective of Defensible Space is to reduce the wildfire threat to your home by changing the characteristics of the surrounding vegetation.

Lean – Prune shrubs and cut back tree branches, especially within 15 feet of your chimney.

Clean – Remove all dead plant material from around your home, this includes dead leaves, dry grass and even stacked firewood.

Green – Plant fire-resistant vegetation that is healthy and green throughout the year.

Did You Know? Defensible space allows firefighters room to put out fires.

FIRE-RESISTANT ATTACHMENTS

Attachments include any structure connected to your home, such as decks, porches or fences. If an attachment to a home is not fire-resistant, then the home as a whole is not fire-safe.

A DISASTER PLAN

The time to plan for a fire emergency is now. Take a few minutes to discuss with your family what actions you will need to take.

- Post your local firefighting agency's telephone number in a visible place.
- Decide where you will go and how you will get there. With fire, you may only have a moments notice. Two escape routes out of your home and out of your neighborhood are preferable.
- Have tools available: shovel, rake, axe, hand saw or chainsaw, and a 2 gallon bucket.
- Maintain an adequate water source.
- Have a plan for your pets.
- Practice family fire drills.

Did You Know? Evacuations for a wildfire can occur without notice. When wildfire conditions exist, BE ALERT.

A FIREWISE HOME HAS...

LEAN, CLEAN AND GREEN LANDSCAPING

With firewise landscaping, you can create defensible space around your home that reduces your wildfire threat. Large, leafy, hardwood trees should be pruned so that the lowest branches are at least 6 to 10 ft high to prevent a fire on the ground from spreading up to the tree tops. Within the defensible space, remove flammable plants that contain resins, oils and waxes that burn readily. Ornamental junipers, yucca, holly, red cedar, and young pine. A list of less-flammable plants can be found within this brochure.

Did You Know? Although mulch helps retain soil moisture, when dry, it can become flammable. Mulch as well as all landscaping should be kept well watered to prevent them from becoming fire fuel.

FIRE-RESISTANT ROOF CONSTRUCTION

Firewise construction materials include Class-A asphalt shingles, metal, cement and concrete products. Additionally, the inclusion of a fire-resistant sub-roof adds protection.

Did You Know? Something as simple as making sure that your gutters, eaves and roof are clear of debris can reduce your fire threat.

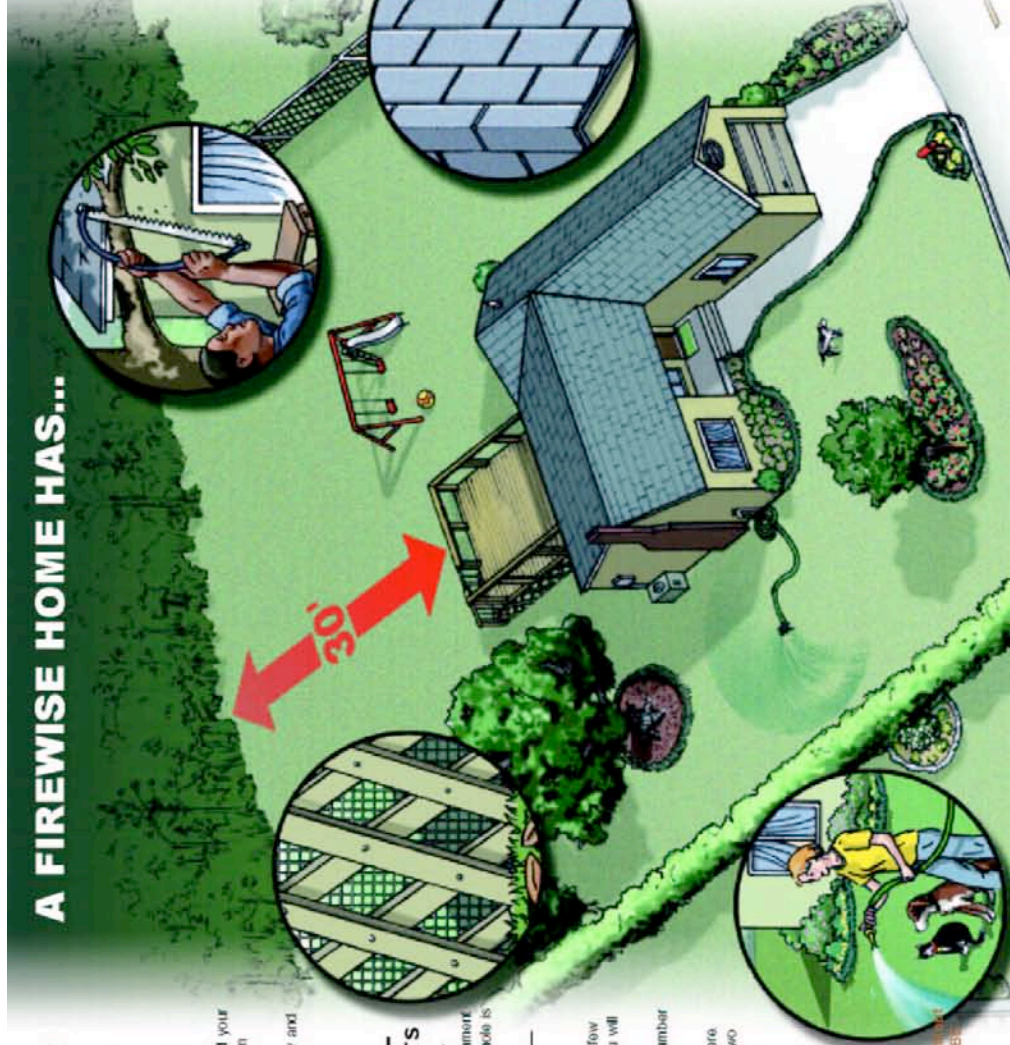
FIRE-RESISTANT EXTERIOR CONSTRUCTION

Wall materials that resist heat and flames include brick, cement, plaster, stucco and concrete masonry. Double pane glass windows can make a home more resistant to wildfire heat and flames.

Did You Know? Although some vinyl will not burn, firefighters have found that some vinyl soffits can melt, allowing embers into the attic space.

EMERGENCY ACCESS

Identify your home and neighborhood with legible and clearly marked street names and numbers so emergency vehicles can rapidly find the location of the emergency. Include a driveway that is at least 12 feet wide with a vertical clearance of 15 feet – to provide access to emergency apparatus.





Firewise Construction Checklist

When constructing, renovating, or adding to a firewise home, consider the following:

- ☐ Choose a firewise location.
- ☐ Design and build a firewise structure.
- ☐ Employ firewise landscaping and maintenance.

To select a firewise location, observe the following:

- ☐ Slope of terrain; be sure to build on the most level portion of the land, since fire spreads more rapidly on even minor slopes.
- ☐ Set your single-story structure at least 30 feet back from any ridge or cliff; increase distance if your home will be higher than one story.

In designing and building your firewise structure, remember that the primary goals are fuel and exposure reduction. To this end:

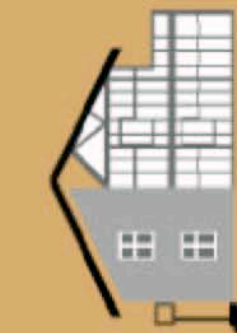
- ☐ Use construction materials that are fire-resistant or non-combustible whenever possible.
- ☐ For roof construction, consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, cement and concrete products, or terra-cotta tiles.
- ☐ Constructing a fire-resistant sub-roof can add protection as well.
- ☐ On exterior wall facing, fire resistive materials such as stucco or masonry are much better choices than vinyl which can soften and melt.
- ☐ Window materials and size are important. Smaller panes hold up better in their frames than larger ones. Double pane glass and tempered glass are more reliable and effective heat barriers than single pane glass. Plastic skylights can melt.
- ☐ Install non-flammable shutters on windows and skylights.
- ☐ To prevent sparks from entering your home through vents, cover exterior attic and underfloor vents with wire screening no larger than 1/8 of an inch mesh. Make sure under-eave and soffit vents are as close as possible to the roof line. Box in eaves, but be sure to provide adequate ventilation to prevent condensation.
- ☐ Include a driveway that is wide enough to provide easy access for fire engines (12 feet wide with a vertical clearance of 15 feet and a slope that is less than 5 percent). The driveway and access roads should be well-maintained, clearly marked, and include ample turnaround space near the house. Also provide easy access to fire service water supplies, whenever possible.
- ☐ Provide at least two ground level doors for easy and safe exit and at least two means of escape (i.e., doors or windows) in each room so that everyone has a way out.
- ☐ Keep gutters, eaves, and roofs clear of leaves and other debris.
- ☐ Make periodic inspections of your home, looking for deterioration such as breaks and spaces between roof tiles, warping wood, or cracks and crevices in the structure.
- ☐ Periodically inspect your property, clearing dead wood and dense vegetation at distance of at least 30 feet from your house. Move firewood away from the house or attachments like fences or decks.

Any structures attached to the house, such as decks, porches, fences, and outbuildings should be considered part of the house. These structures can act as fuel bridges, particularly if constructed from flammable materials. Therefore, consider the following:

- ☐ If you wish to attach an all-wood fence to your house, use masonry or metal as a protective barriers between the fence and house.
- ☐ Use metal when constructing a trellis and cover it with high-moisture, low flammability vegetation.
- ☐ Prevent combustible materials and debris from accumulating beneath patio decks or elevated porches. Screen or box-in areas below patios and decks with wire screen no larger than 1/8 inch mesh.
- ☐ Make sure an elevated wooden deck is not located at the top of a hill where it will be in direct line of a fire moving up slope. Consider a terrace instead.

Access additional information on the Firewise home page: www.firewise.org

Please see the other side of this sheet for the *Firewise Landscaping Checklist*.



Construction



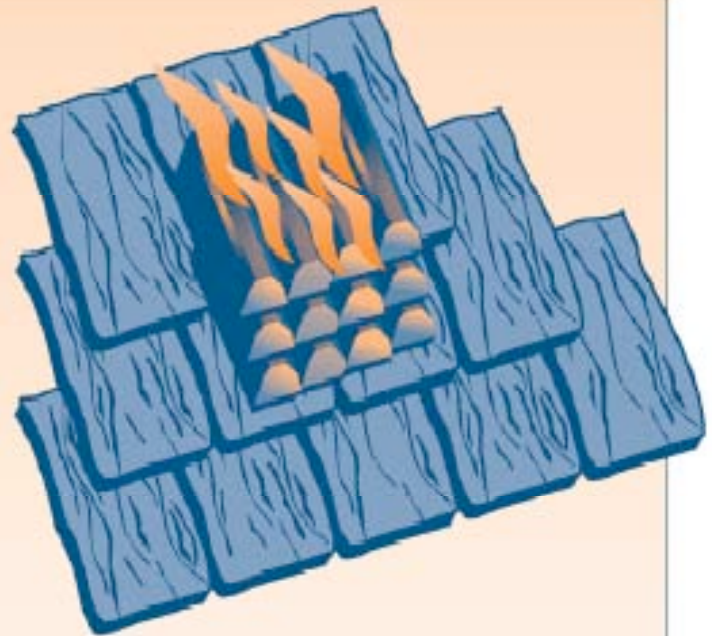
TESTING FOR COMBUSTIBILITY

Testing involves burning wood cribs or brands of varied sizes placed on the roof surface to test the combustibility of roofing materials. This simulates the spotting of firebrands and flaming debris so typical of wildland fires.

To attain a Class A rating, a test roof must remain unburned after the largest brand is placed on the roof and allowed to burn itself out.

Smaller brands are used to help determine B and C ratings.

Underwriters' Laboratories of Canada (ULC) rated Class A roofing material test is wood cribbing material of kiln-dried, knot-free Douglas-fir. Wood crib dimensions are 305mm square and about 57mm high. Wood crib is three layers of 12, 19mm by 19mm by 305mm strips, arranged 12mm apart, nailed at each end. Each layer is stacked 90 degrees to adjacent layer.



Rating	Class A	Class B	Class C
Fire Resistance	High	Moderate	Low

Source: Partners in Protection

COMMON ROOF TYPES AND FIRE RATINGS

Type	Fire Rating	Advantages and Disadvantages
Clay Tile	Class A	Durable but fragile. Heavy tiles need strong framing. (Can re-roof on standard framing with bracing).
Concrete Tile	Class A	Weight/breakage challenge as with clay tile. (lightweight concrete tile available)
Fibreglass / Asphalt Composition Shingles	Class A	Easy to apply, most common and economical of A-rated roofs. Some homeowners associations have covenants forbidding use.
Metal Roofing	Rating requirements vary: Class A – if old roof removed. Class B – installed with heavy roofing paper over old roof. Class C – if applied directly over old roof.	Lightweight and durable, wide color range. Some designed to simulate shake roof appearance.
Fibrous Cement Shake	Rating requirements vary: Class A – if installed over plywood. Class B – if not installed over plywood.	Lightweight and durable. Best simulation of shake and slate appearance. No roof reinforcement needed.
Built-up Roof	Rating requirements vary: Class A – 9 layers of roofing felt. Class B – 7 layers of roofing felt. Class C – 3 layers of roofing felt.	Standard tar and gravel flat roof, inexpensive. Unless done properly, no rating secured at all. (Asphalt or paper felt placed over wood with insufficient top coating is very flammable).
ULC Rated Shakes	Rating requirements vary: Class A – 'B'-rated shakes over roof deck Class B – 'B'-rated shakes over sheathing. Class C – 'C'-rated shakes over lathing. No other shakes meet fire ratings.	Must be kept clean. Moss, needles and other debris increase fire danger.
Unrated Shakes	None	Untreated shakes (or those with spray-on fire-retardant treatments) are highly combustible.



Firewise Landscaping Checklist



Landscaping



When designing and installing a firewise landscape, consider the following:

- ☐ Local area fire history.
- ☐ Site location and overall terrain.
- ☐ Prevailing winds and seasonal weather.
- ☐ Property contours and boundaries.
- ☐ Native vegetation.
- ☐ Plant characteristics and placement (duffage, water and salt retention ability, aromatic oils, fuel load per area, and size).
- ☐ Irrigation requirements.

To create a firewise landscape, remember that the primary goal is fuel reduction. To this end, initiate the zone concept. Zone 1 is closest to the structure; Zones 2-4 move progressively further away.

- ☐ **Zone 1.** This well-irrigated area encircles the structure for at least 30' on all sides, providing space for fire suppression equipment in the event of an emergency. Plantings should be limited to carefully spaced low flammability species.
- ☐ **Zone 2.** Low flammability plant materials should be used here. Plants should be low-growing, and the irrigation system should extend into this section.
- ☐ **Zone 3.** Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.
- ☐ **Zone 4.** This furthest zone from the structure is a natural area. Selectively prune and thin all plants and remove highly flammable vegetation.

Also remember to:

- ☐ Be sure to leave a minimum of 30' around the house to accommodate fire equipment, if necessary.
- ☐ Widely space and carefully situate the trees you plant.
- ☐ Take out the "ladder fuels" — vegetation that serves as a link between grass and tree tops. This arrangement can carry fire to a structure or from a structure to vegetation.
- ☐ Give yourself added protection with "fuel breaks" like driveways, gravel walkways, and lawns.

When maintaining a landscape:

- ☐ Keep trees and shrubs properly pruned. Prune all trees so the lowest limbs are 6' to 10' from the ground.
- ☐ Remove leaf clutter and dead and overhanging branches.
- ☐ Mow the lawn regularly.
- ☐ Dispose of cuttings and debris promptly, according to local regulations.
- ☐ Store firewood away from the house.
- ☐ Be sure the irrigation system is well maintained.
- ☐ Use care when refueling garden equipment and maintain it regularly.
- ☐ Store and use flammable liquids properly.
- ☐ Dispose of smoking materials carefully.
- ☐ Become familiar with local regulations regarding vegetation clearances, disposal of debris, and fire safety requirements for equipment.
- ☐ Follow manufacturers' instructions when using fertilizers and pesticides.

Access additional information on the Firewise home page: www.firewise.org

Please see the other side of this sheet for the *Firewise Construction Checklist*.

VEGETATION MANAGEMENT STRATEGIES

Other factors that figure prominently in a community's choice of vegetation management strategy are maintenance, water requirements, homeowner capabilities, erosion control, and historical weather and fire behavior patterns.

Vegetation management strategies break down into three approaches. These are:

- Fuel removal
- Fuel reduction
- Fuel conversion

Recommended guidelines are provided for each vegetation management strategy. For communities or individuals seeking a higher degree of protection, vegetation management standards providing a higher level of protection are outlined in Appendix 2: Fuel Reduction Standards for Crown Fire Hazard.



Before

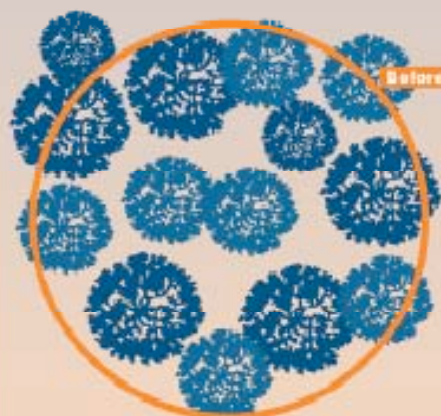


After

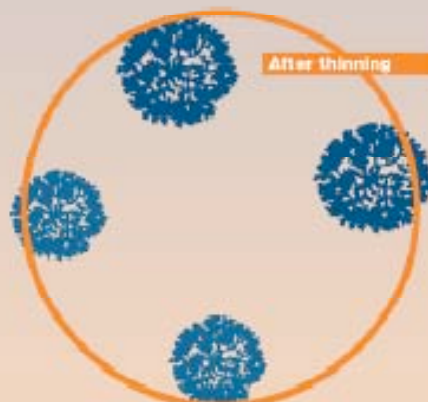
Source: Partners in Protection

THINNING REQUIREMENTS

Thin forest stands to reduce crown cover to less than 40 percent with at least 3 metres between crowns (up to 6 metres between crowns may be required in some situations). Crown cover is the percentage of ground area covered by tree crowns if viewed from above.



Before thinning



After thinning



Thinning reduces the crown cover of the forest



Source: Partners in Protection

SLOPES



Flat terrain



30% slope



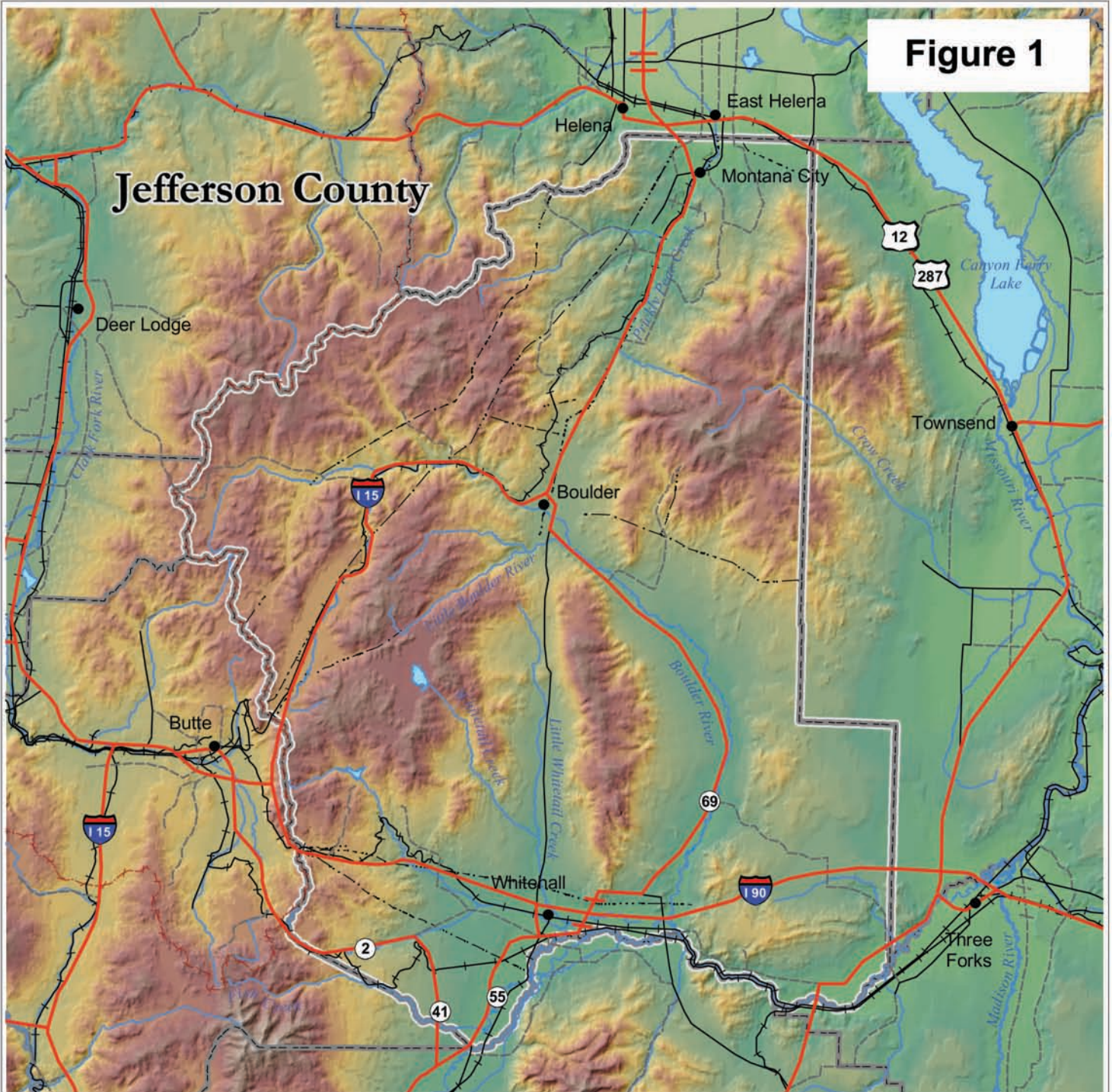
55% slope

Increasing slopes require increased treatment distances to be effective

Where slope below the building is 30 percent slope, fuel treatment distances (accomplished to 30 metres from the building on level ground) would increase by 2x to 60 metres downslope and by 1.5x to 45 metres horizontal. On a 55 percent slope the distance would increase by 4x to 120 metres downslope and by 2x to 60 metres horizontal.

Source: Partners in Protection

Figure 1



Legend

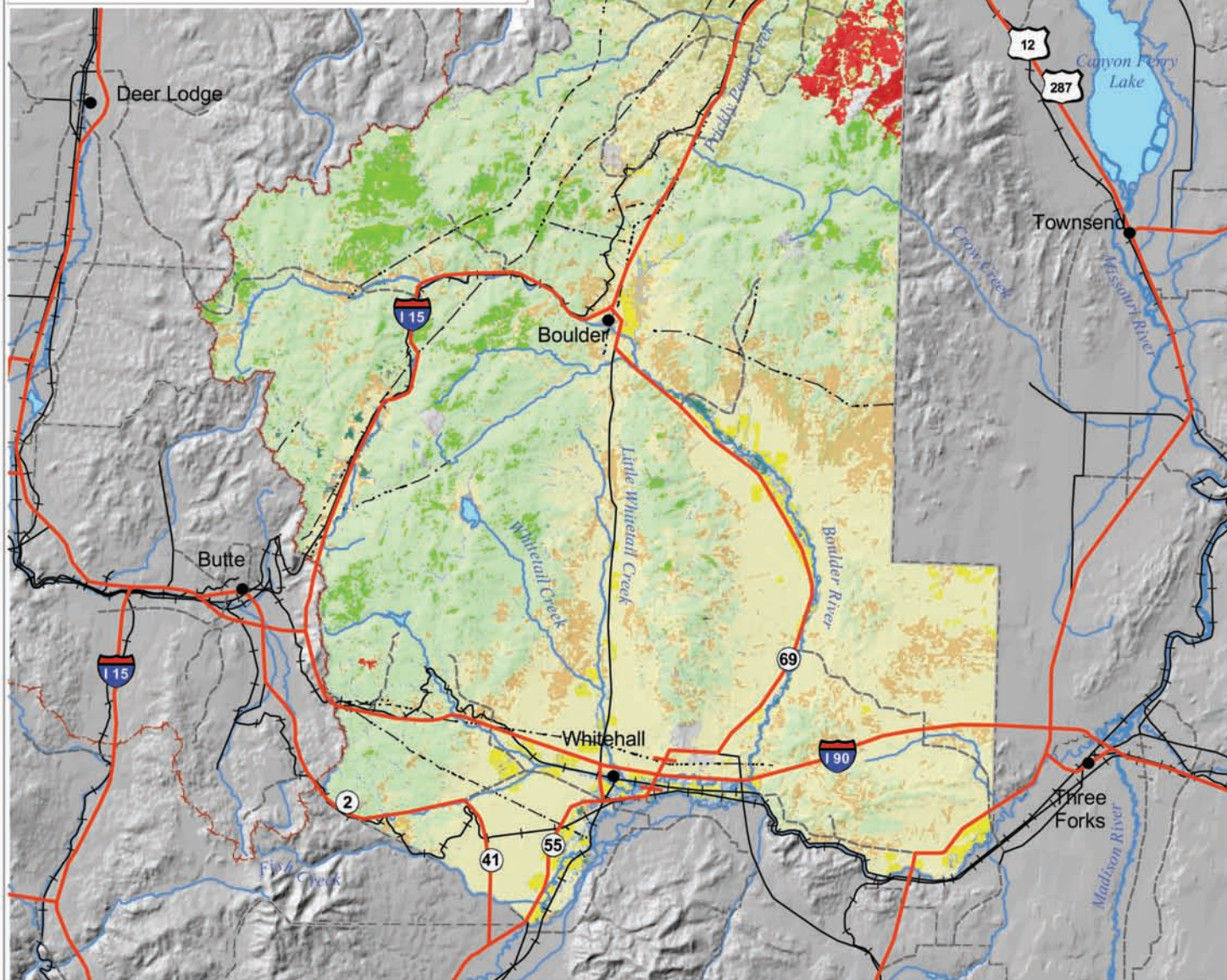
- Cities and Towns
- County Boundary
- ~ Rivers and Streams
- ~ Lakes
- ~ Highways
- ~ Secondary Roads
- ~ Local Roads
- ~ Railroads
- ~ Powerlines
- ~ Continental Divide



1:570,000
 Projection: Montana State Plane
 North American Datum 1983
 Data Source: Montana Natural Resource Information System
 Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Land Cover

Figure 2



Land Cover Types (90m)

Shrub and Grass Lands

- Agriculture/Altered Herbaceous
- Grasslands/Alpine-Subalpine Meadows
- Shrublands/Sagebrush

Riparian

- Graminoid/Shrub Riparian
- Mixed Riparian

Forest

- Xeric Mixed Forest
- Mesic Mixed Forest
- Mixed Subalpine Forest
- Mixed Broadleaf Forest
- Previously Burned Forest
- Rock/Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

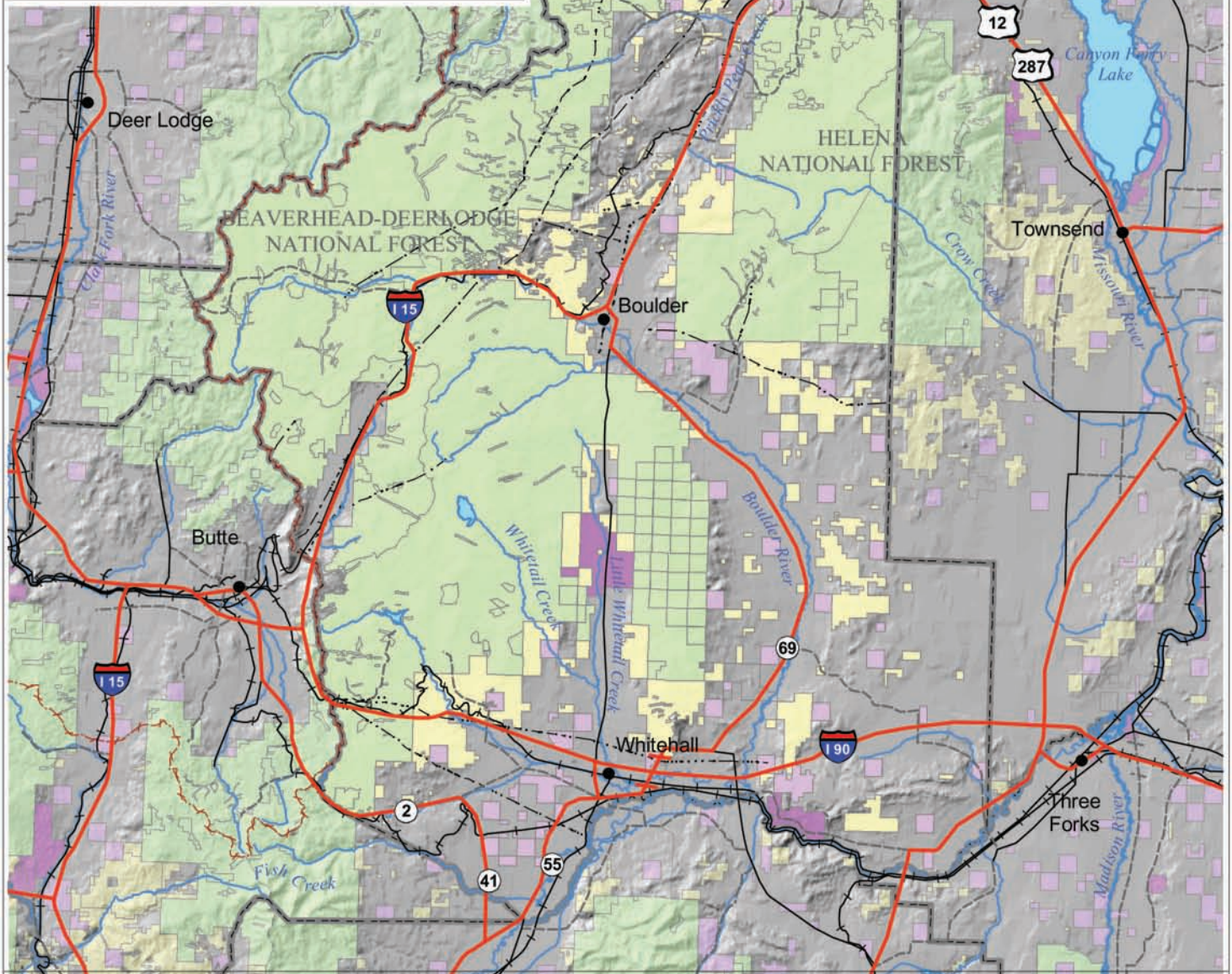
Fox Logic, LLC

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Miles

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Projection: Montana State Plane; North American Datum 1983
Data Source: Montana Natural Resource Information System
Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Land Administration

Figure 3



Land Administration

- Private Lands
- State Lands
- Forest Service
- Fish, Wildlife & Parks
- Bureau of Land Management
- Plum Creek

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

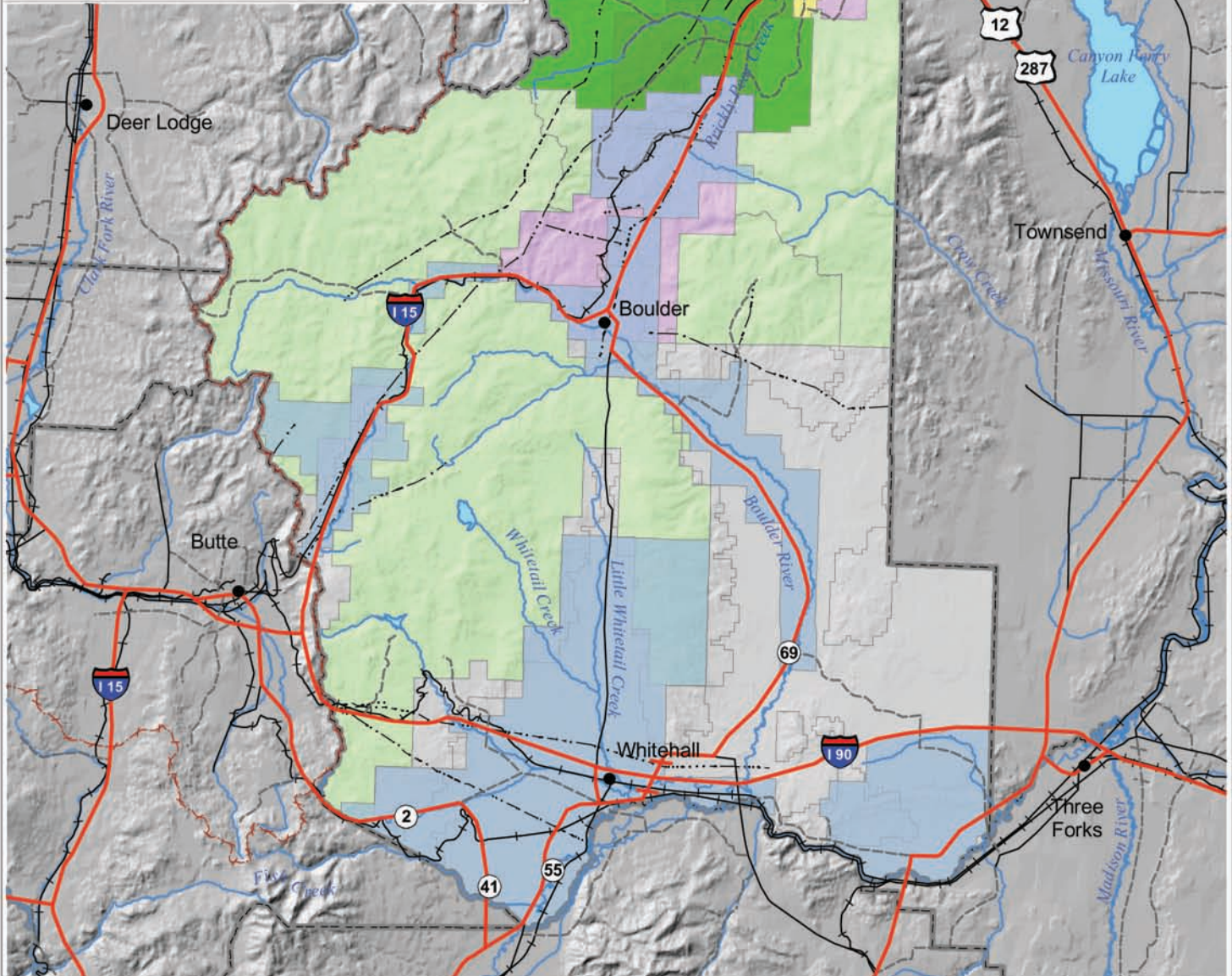
Fox Logic, LLC

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Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Fire Protection

Figure 4



Fire Protection Agency

- | | |
|-------------------------|-------------------------|
| Rural Fire District | State Fire Protection |
| Fire Service Area | Federal Fire Protection |
| Volunteer Fire District | No Fire Protection |

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

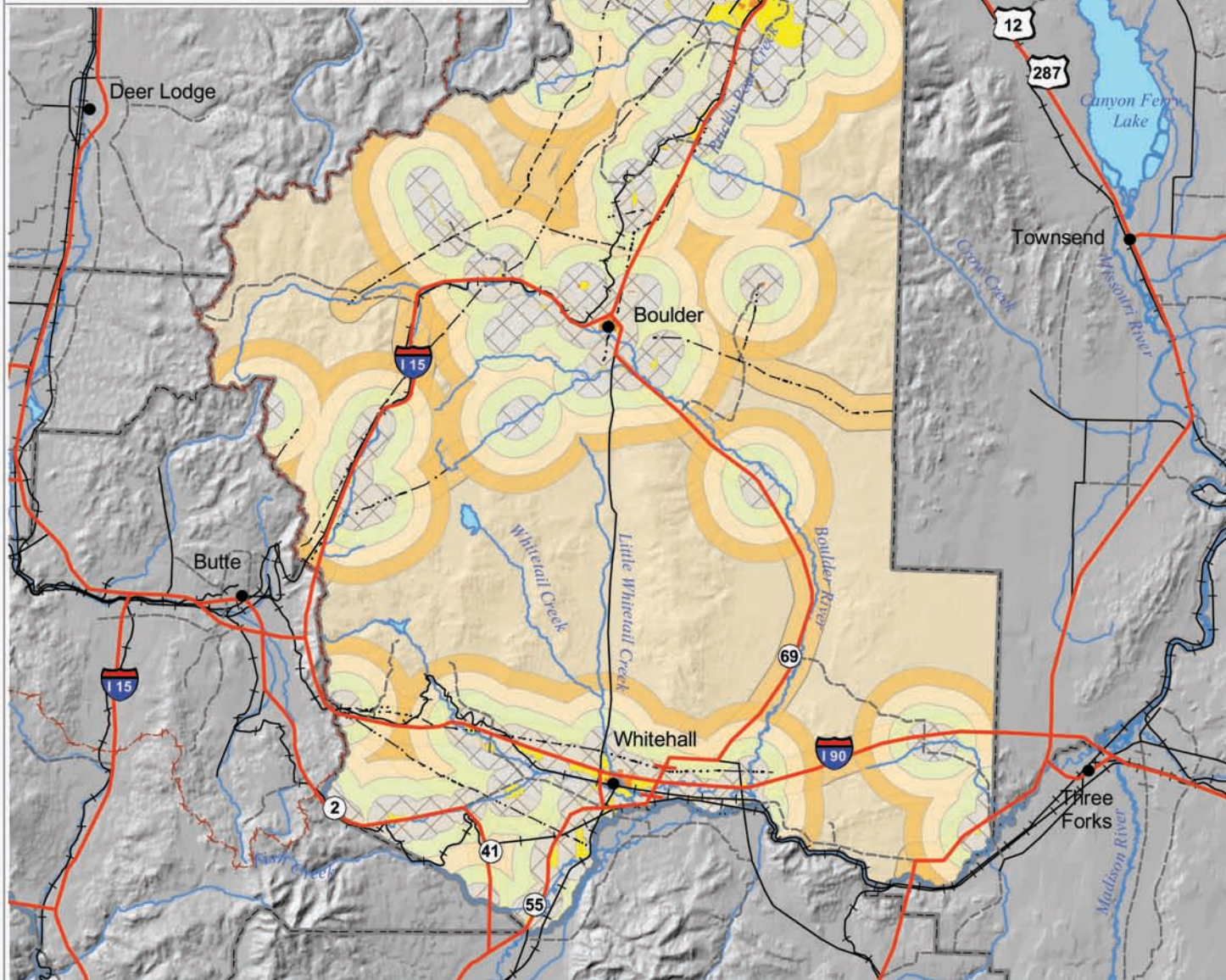
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Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Wildland Urban Interface

Figure 5



Jefferson Wildland Urban Interface

HFRA WUI Ratings

- High Density
- Medium Density
- Low Density

WUI Buffers

- 1 Mile
- 2 Mile
- 3 Mile
- 4 Mile/
1 Mile Highway
and Powerline

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

Fox Logic, LLC

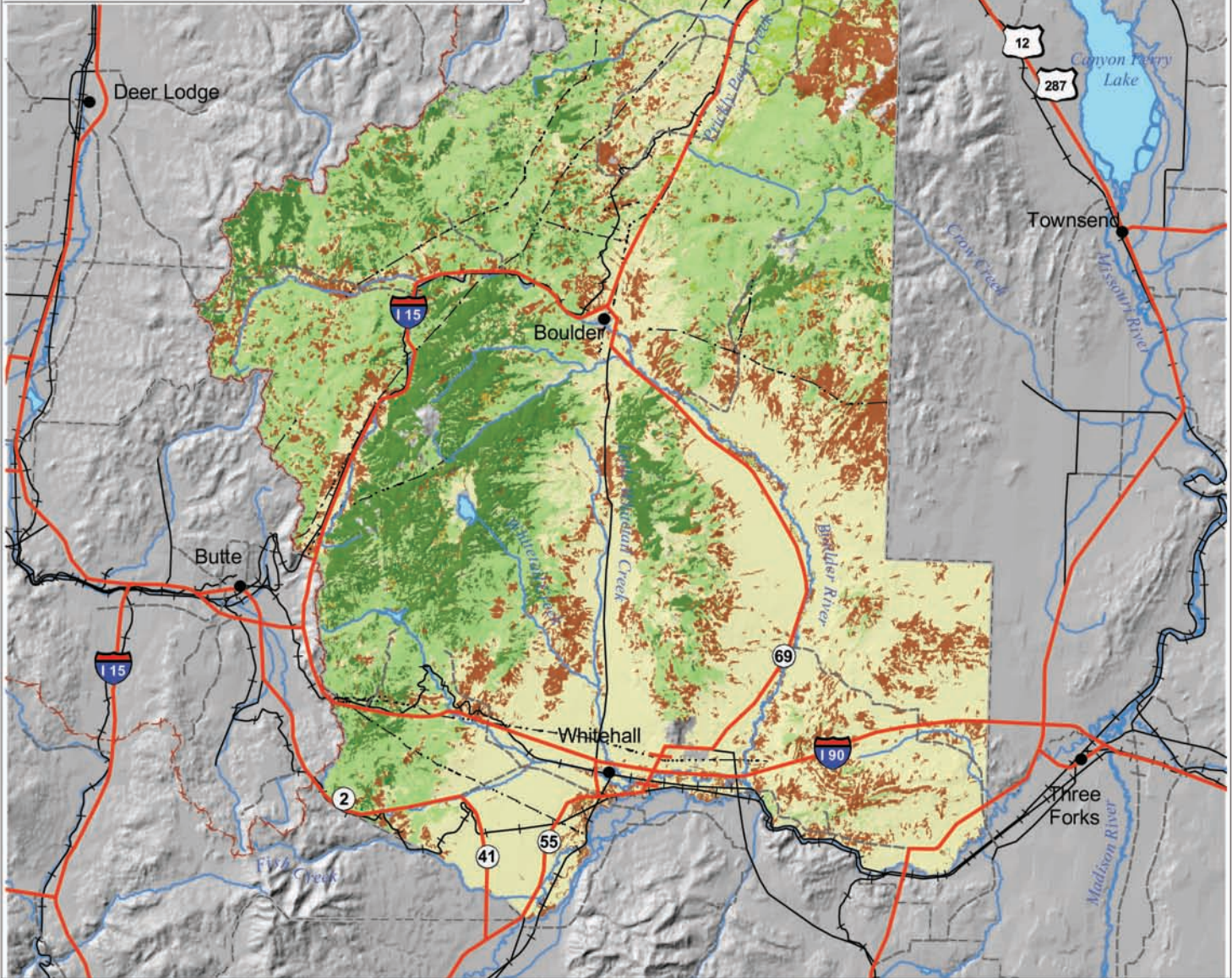
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Miles

1:570,000
Projection: Montana State Plane
North American Datum 1983

Data Source: Montana Natural Resource Information System
WUI Data: Forest Ecology and Management, University of Wisconsin, Silvics Lab 2005
Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Fire Behavior Fuel Models

Figure 6



Fire Behaviour Fuel Models

- | | |
|--|--|
| 1= Grass and grass-dominated
(Shortgrass up to 1 ft.) | 9= Timber litter
(Ponderosa pine litter) |
| 2= Grass and grass-dominated
(Timber: grass and understory) | 10= Timber litter
(Litter and understory) |
| 5= Chaparral and shrub fields
(Brush up to 2 ft.) | Urban, Other |
| 8= Timber litter
(Closed timber litter) | |

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines
- Continental Divide
- Rivers and Streams
- Lakes

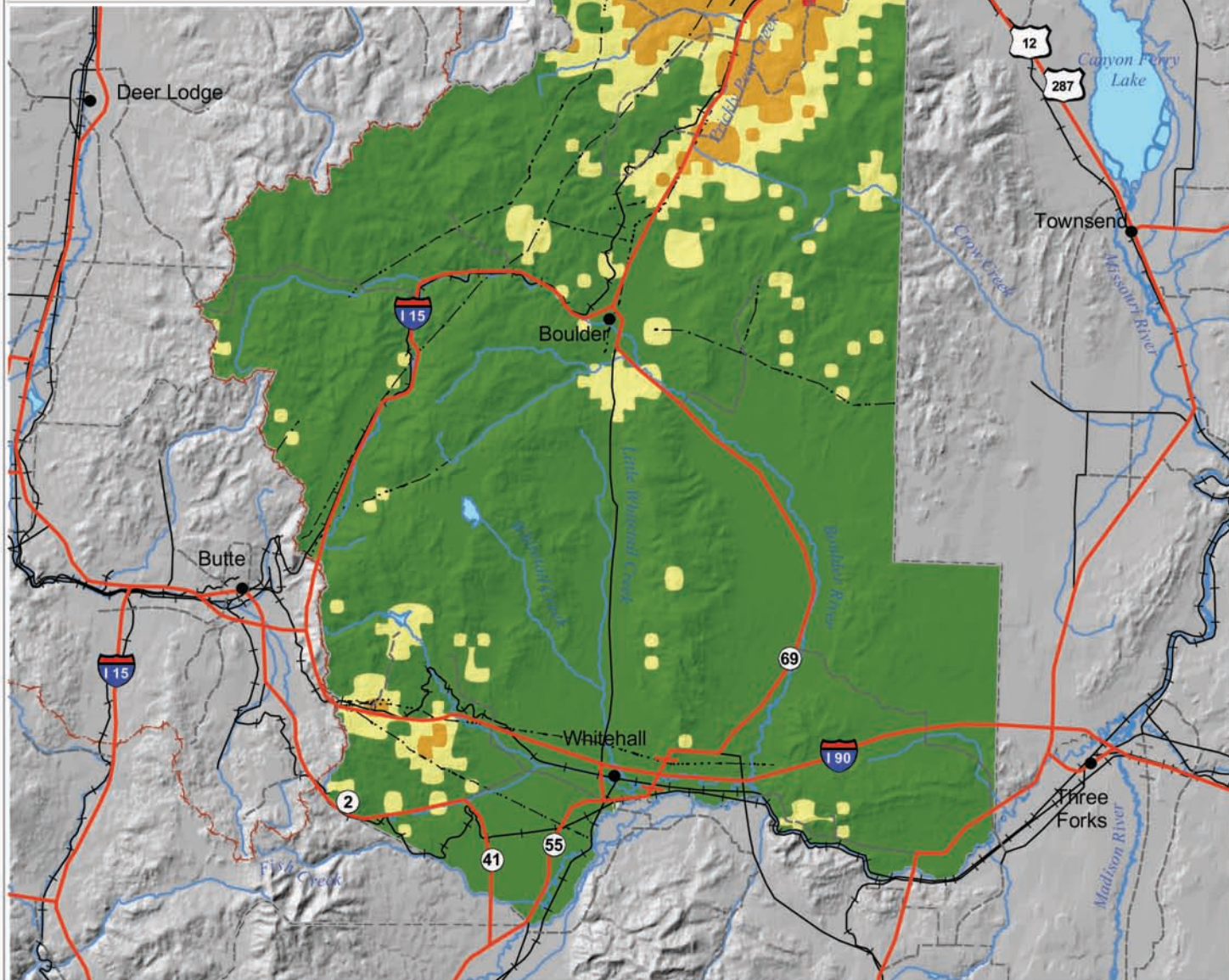
Fox Logic, LLC

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Projection: Montana State Plane; North American Datum 1983
Data Source: Montana Natural Resource Information System.
Fuel model data derived through the FIRE RISK Project Wildlife Spatial Analysis Lab.
The University of Montana, Missoula, MT, Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Ignition Probability

Figure 7



Fire Ignition Probability (# fires/1,000 acres/10 years)

- Low (0.0 to 0.154)
- Moderate (0.154 to 0.535)
- High (0.535 to 1.525)
- Very-High (1.525 to 10.50)

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

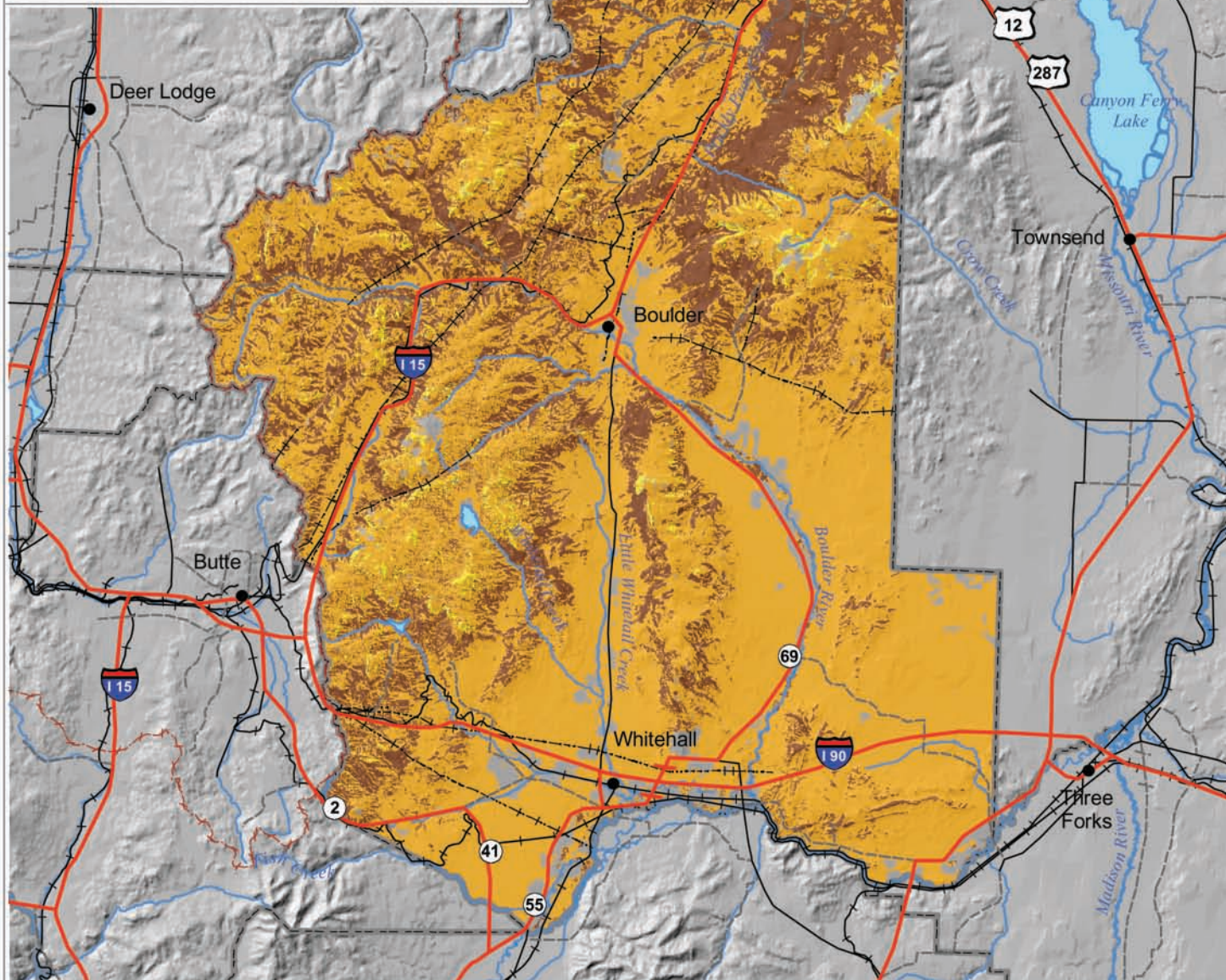
Fox Logic, LLC

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Miles

1:570,000
Projection: Montana State Plane; North American Datum 1983
Data Source: Montana Natural Resource Information System,
The Wildlife Spatial Analysis Lab, The University of Montana
Ignition probability data has been altered for presentation purposes.
Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Fire Condition Class

Figure 8



Fire Condition Class (Departure from historic fire regime)

- 1- natural/near natural fire cycle
- 2- >1 missed fire cycle
- 3- =>3 missed fire cycles
- Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Powerlines

- Continental Divide
- Rivers and Streams
- Lakes

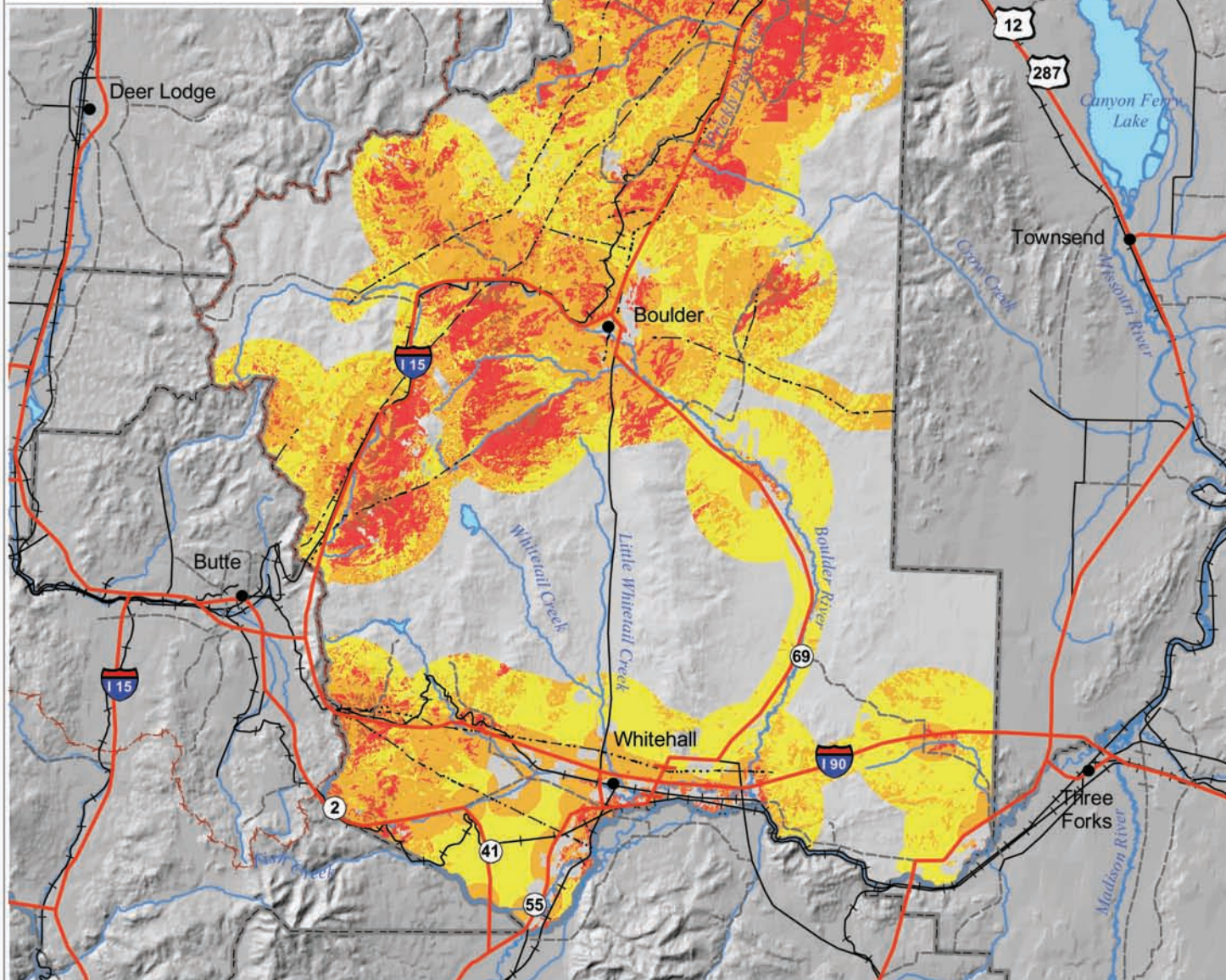
Fox Logic, LLC

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Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
Condition class data derived through the FIRE RISK Project
Wildlife Spatial Analysis Lab, The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones

Jefferson County Community Wildfire Protection Plan Fire Risk/WUI Impact Model

Figure 9



Fire Risk/WUI Impact Model

Low Priority

Medium Priority

High Priority

Very-High Priority

Urban, Other

Cities and Towns

Highways

Secondary Roads

Local Roads

Railroads

Powerlines

Continental Divide

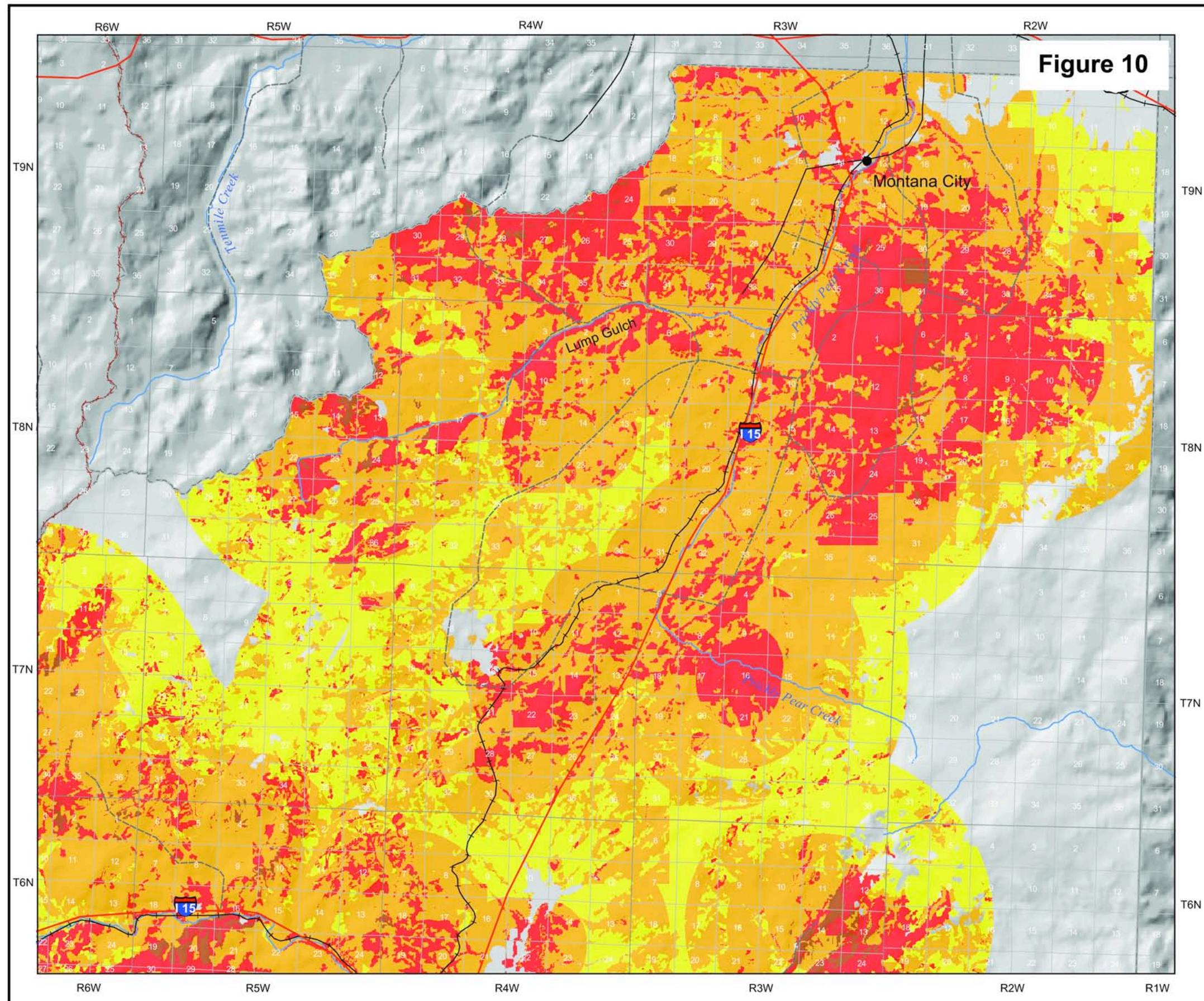
Rivers and Streams

Lakes

Fox Logic, LLC

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Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System
and the FIRERISK Project at the Wildlife Spatial Analysis Lab,
The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones



Jefferson County Community Wildfire Protection Plan

Fire Risk/WUI Impact Model Northern Jefferson

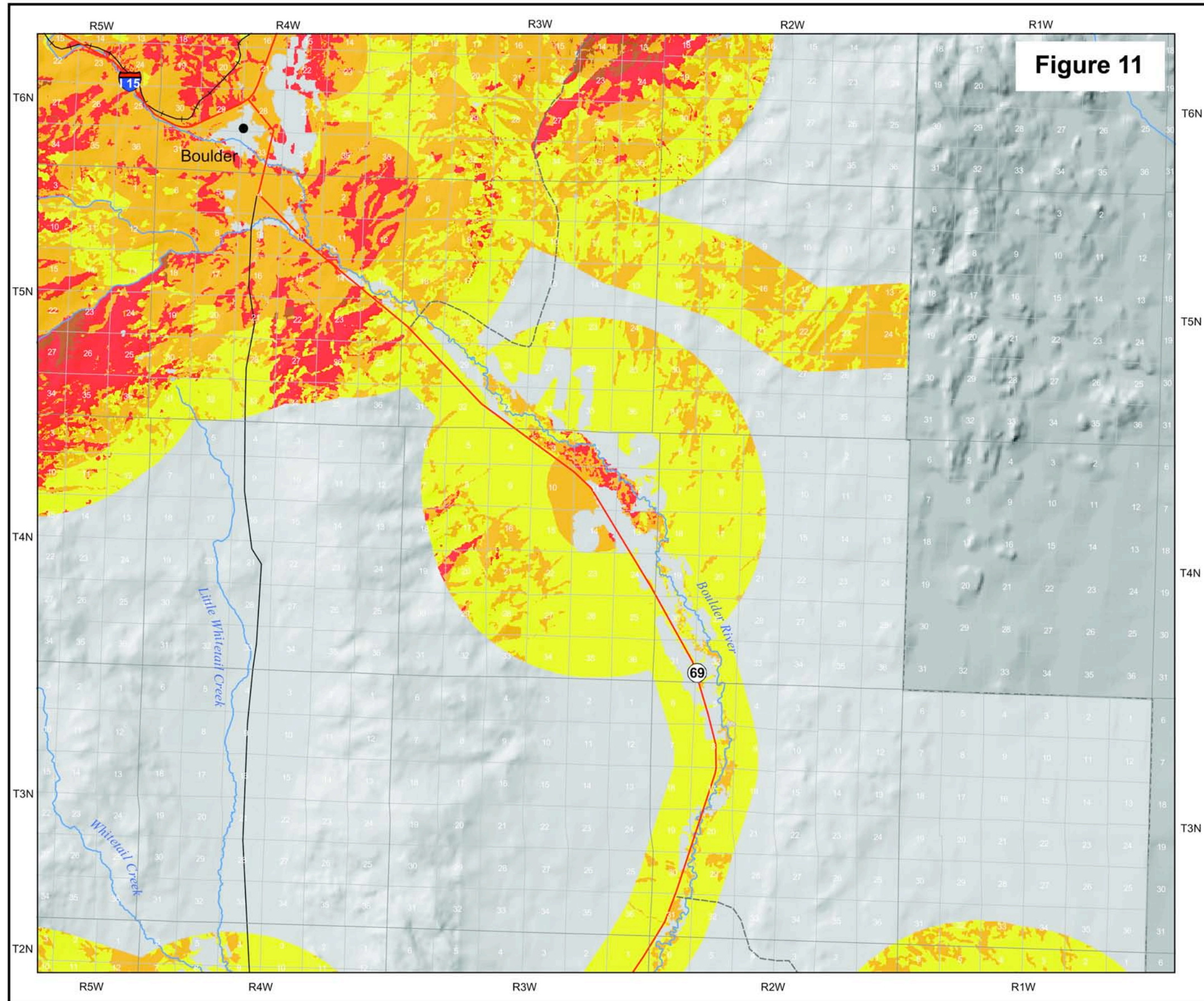
- Legend**
- Fire Risk/WUI Impact Model**
- Low Priority
 - Medium Priority
 - High Priority
 - Very-High Priority
 - Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Powerlines
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System and the
FIRERISK Project at the Wildlife Spatial Analysis Lab.
The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones



Jefferson County Community Wildfire Protection Plan Fire Risk/WUI Impact Model East Central Jefferson

- Legend**
- Fire Risk/WUI Impact Model**
- Low Priority
 - Medium Priority
 - High Priority
 - Very-High Priority
 - Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Powerlines
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System and the
FIRERISK Project at the Wildlife Spatial Analysis Lab.
The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones

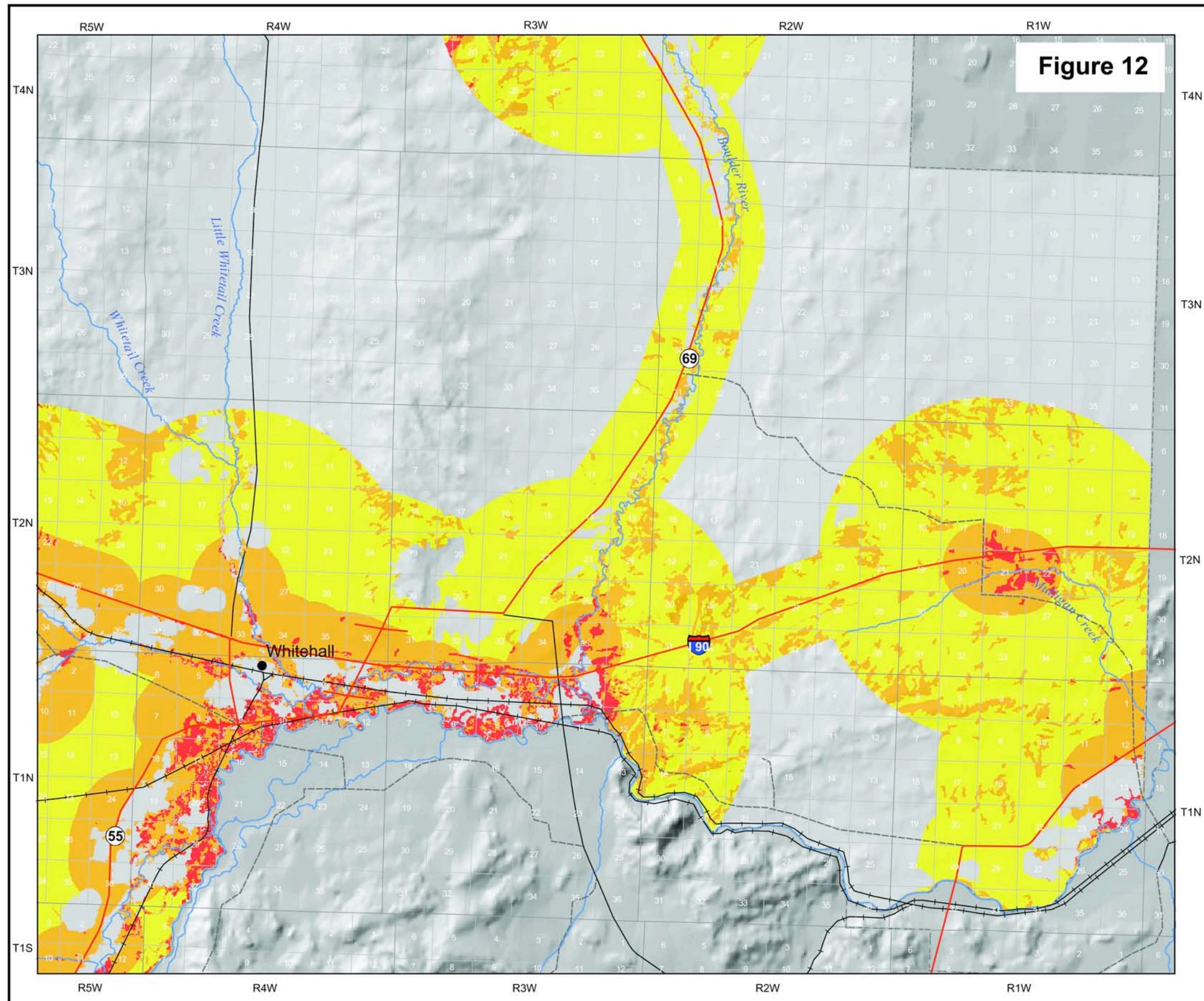


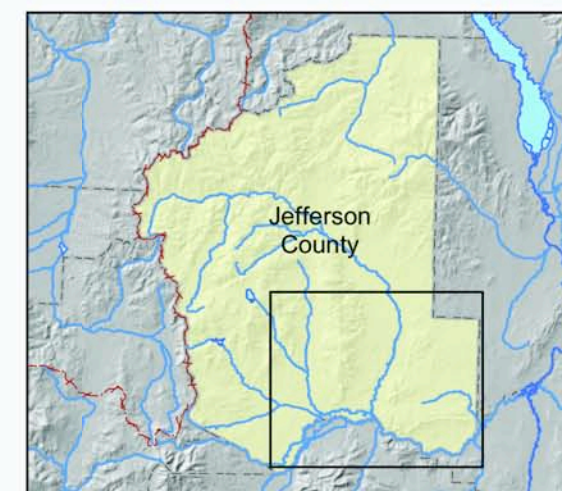
Figure 12

Jefferson County Community Wildfire Protection Plan Fire Risk/WUI Impact Model Southeast Jefferson

- Legend**
- Fire Risk/WUI Impact Model**
- Low Priority
 - Medium Priority
 - High Priority
 - Very-High Priority
 - Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Powerlines
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System and the
FIRERISK Project at the Wildlife Spatial Analysis Lab.
The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones

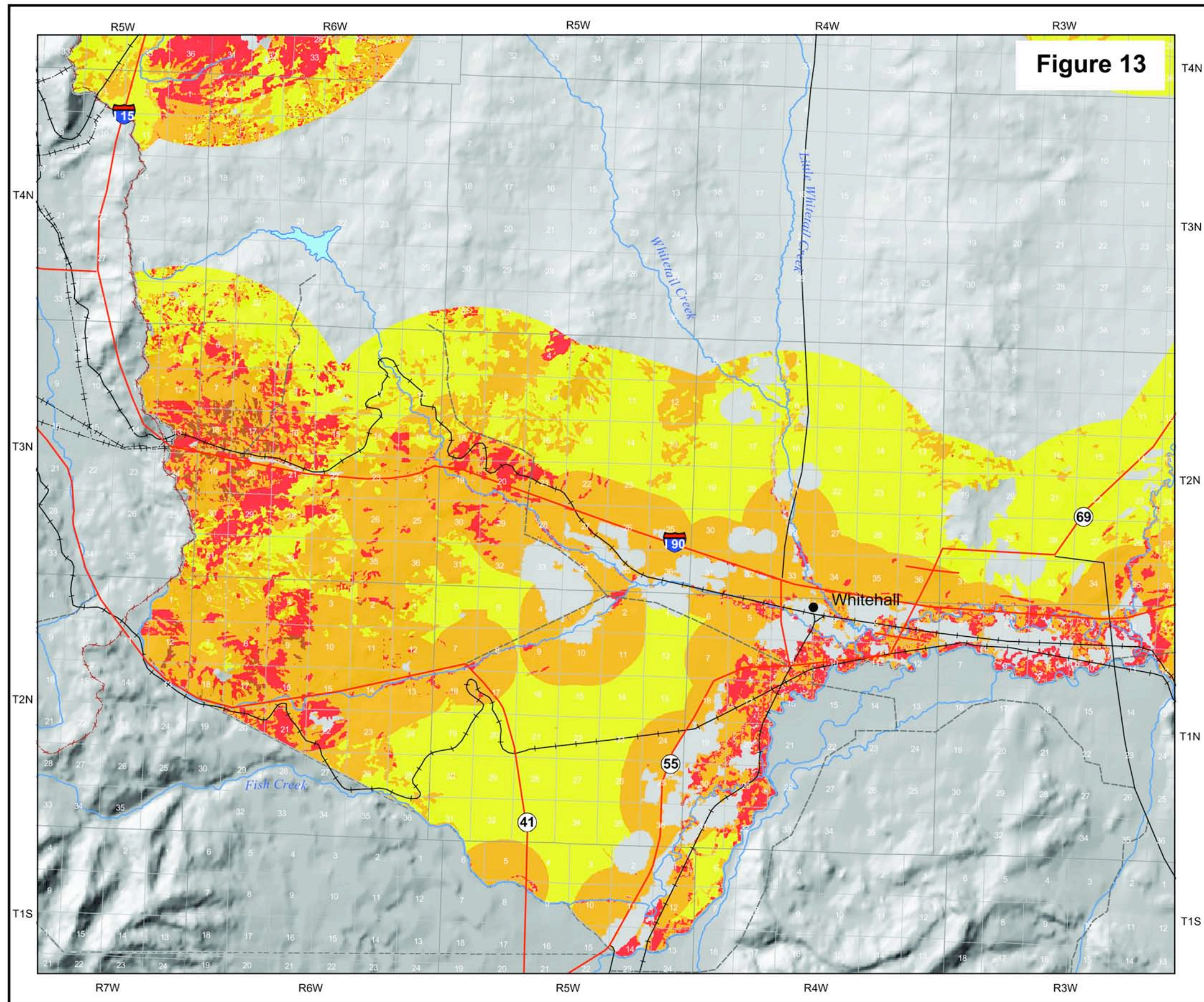


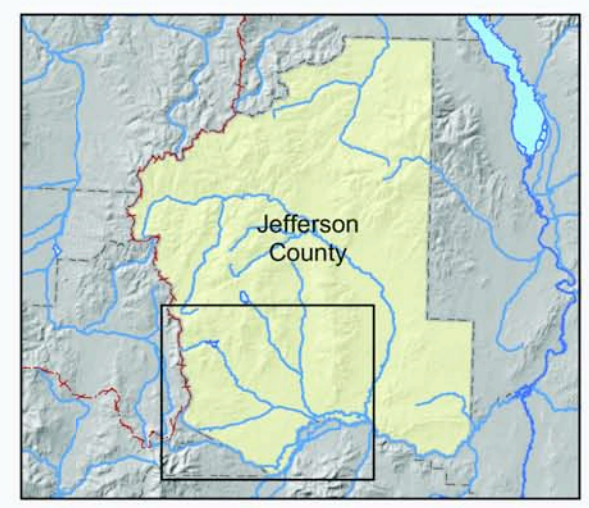
Figure 13

Jefferson County Community Wildfire Protection Plan Fire Risk/WUI Impact Model Southwest Jefferson

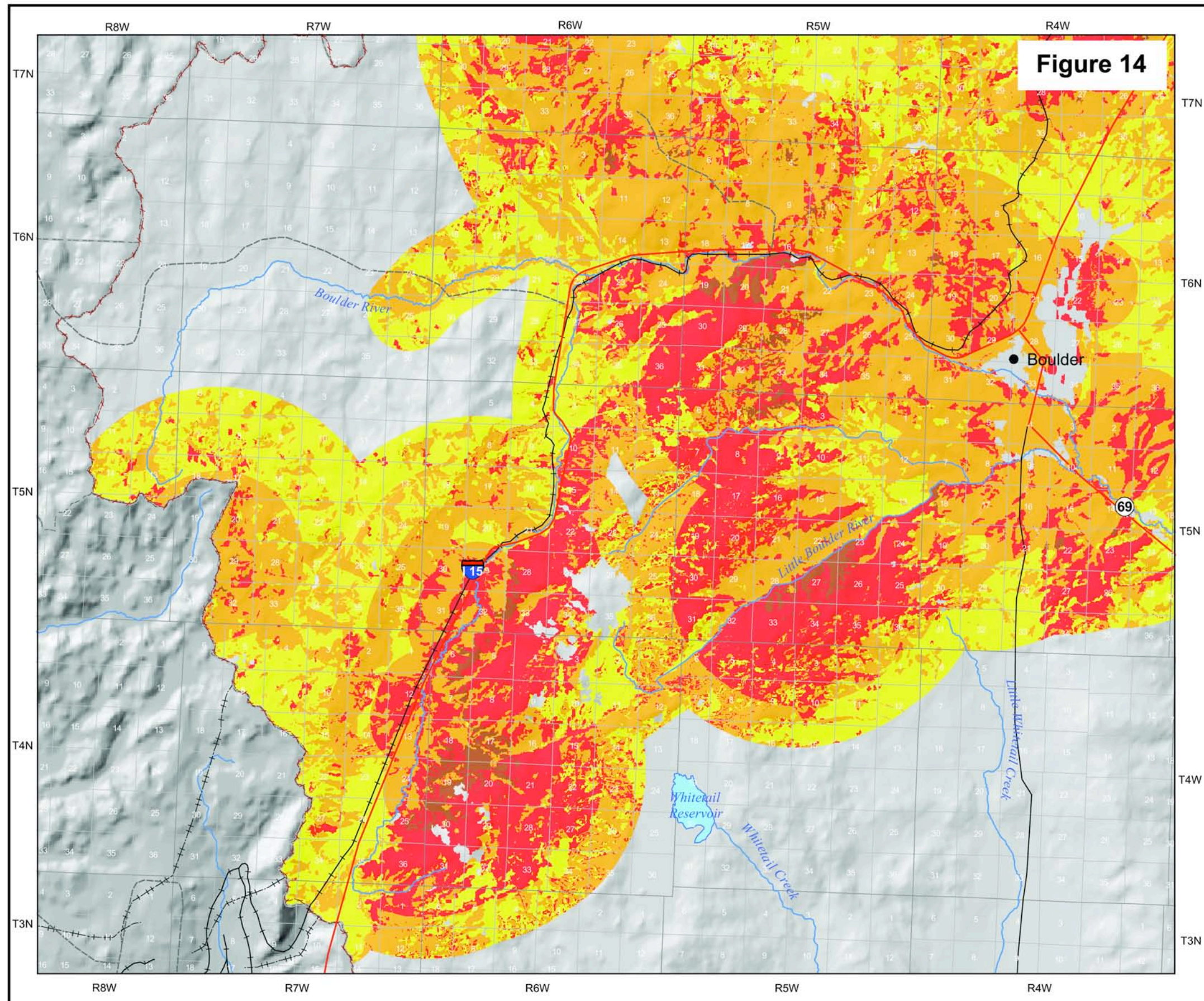
- Legend**
- Fire Risk/WUI Impact Model**
- Low Priority
 - Medium Priority
 - High Priority
 - Very-High Priority
 - Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Powerlines
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System and the
FIRERISK Project at the Wildlife Spatial Analysis Lab.
The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones

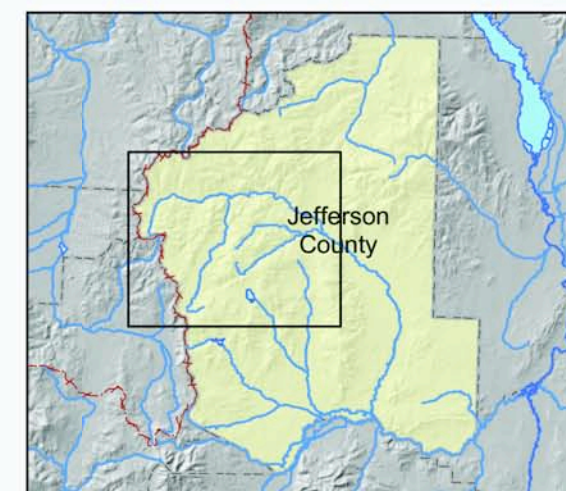


Jefferson County Community Wildfire Protection Plan Fire Risk/WUI Impact Model West Central Jefferson

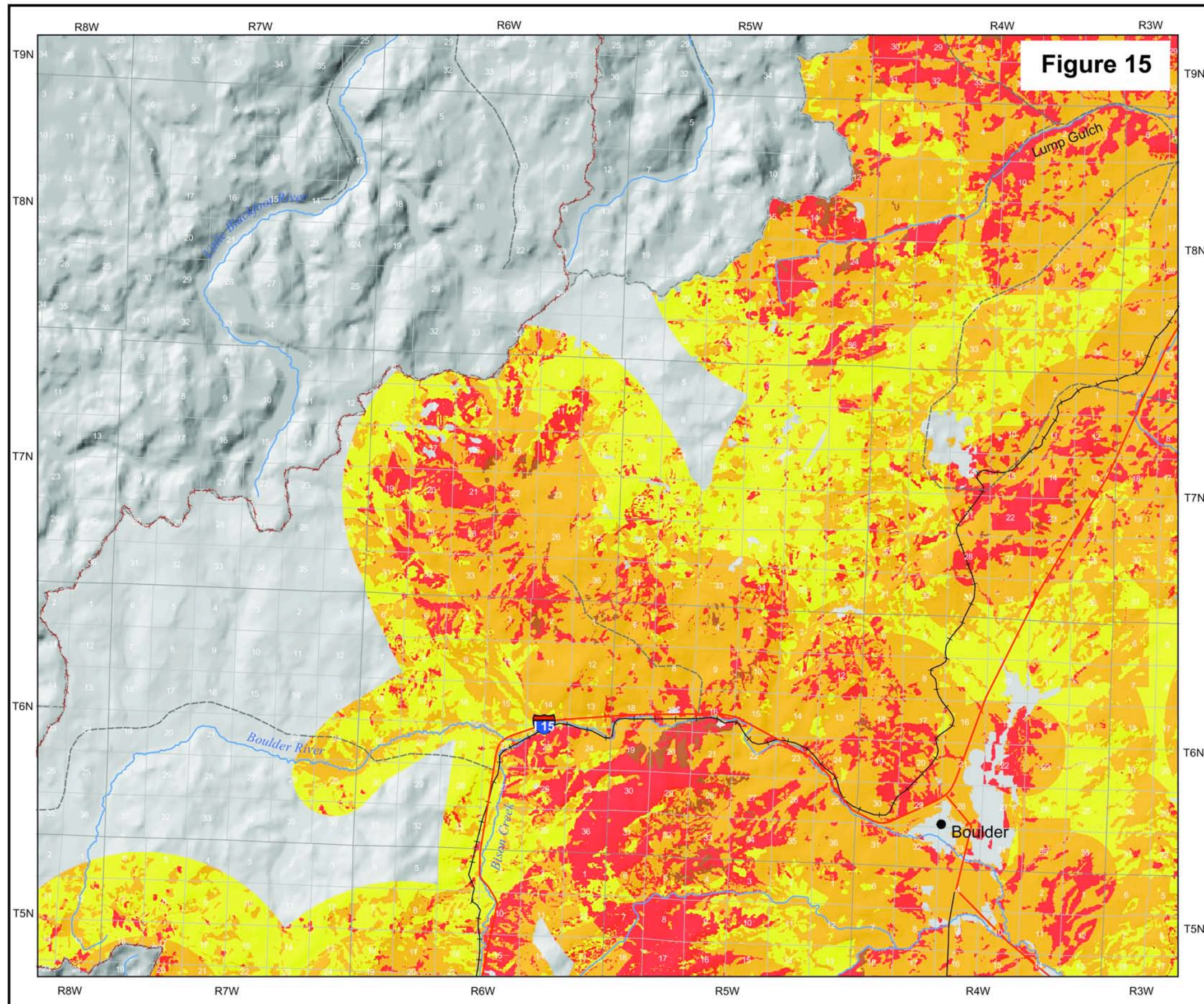
- Legend**
- Fire Risk/WUI Impact Model**
- Low Priority
 - Medium Priority
 - High Priority
 - Very-High Priority
 - Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Powerlines
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



1:150,000
Projection: Montana State Plane
North American Datum 1983
Data Source: Montana Natural Resource Information System and the
FIRERISK Project at the Wildlife Spatial Analysis Lab.
The University of Montana, Missoula, MT
Fox Logic 2005; Created by Thad Jones

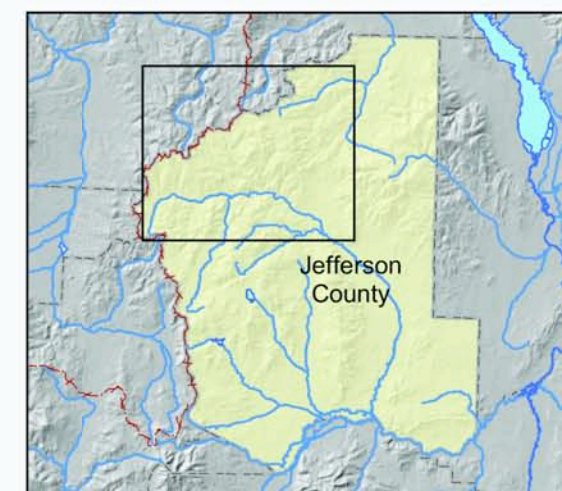


Jefferson County Community Wildfire Protection Plan Fire Risk/WUI Impact Model Northwest Jefferson

- Legend**
- Fire Risk/WUI Impact Model**
- Low Priority
 - Medium Priority
 - High Priority
 - Very-High Priority
 - Urban, Other

- Cities and Towns
- Highways
- Secondary Roads
- Local Roads
- Railroads
- Continental Divide
- Powerlines
- Rivers and Streams
- Lakes

0 0.5 1 2 3 4
Miles



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